



# MACHINIST PROGRAM OF INSTRUCTION

## PREFACE

1. The Machinist Course is designed to provide instruction for the tasks listed in Section VI of this POI. The terminal learning objectives for each lesson in Section IV have been developed from the task list. Both the task inventory and learning objectives are continually refined through the procedures set forth in Section VII.
2. All agencies and commands receiving graduates of this course, and specifically those sighted in Section VIII, are requested to review the contents of this POI and evaluate performance of the graduates against the field requirements. Comments and recommendations may be submitted to:

COMMANDING OFFICER  
Marine Detachment  
U.S. Army Ordnance Center and School  
4403 Springfield Ave.  
Aberdeen Proving Ground, Maryland 21005-5281  
ATTN: Academic Officer

3. The following information for this course has been submitted for inclusion in the current edition of the NAVMC 2771 (Formal School Catalog):

MACHINIST PROGRAM OF INSTRUCTION

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MACHINIST PROGRAM OF INSTRUCTION

SECTION I - COURSE DESCRIPTIVE DATA

1. COURSE TITLE. MACHINIST
2. LOCATION. United States Marine Corps, Marine Detachment, US Army Ordnance Center & School, Aberdeen Proving Ground, MD 21005-5281
3. COURSE ID. A012151
4. OTHER SERVICE COURSE NUMBER. 702-2161
5. MILITARY ARTICLES AND SERVICE LIST NUMBER. NONE
6. PURPOSE. To train basic enlisted machinists to perform various duties incident to fabrication, repair or modification of equipment and accessories. Duties include selection of proper stock and set up of work on lathes, shaping & milling machines, internal and external grinders, drill presses, and saws. Machinists work from examples, diagrams, blueprints, written specifications, or oral instructions. The control of quality and accuracy is met by the machinists use of precision measuring devices to include, micrometers, vernier calipers, and other measuring devices. Maintenance of all shop equipment is performed to ensure that serviceability is maintained. Coordination with other repair shops, reporting of work completion, and the shop administrative functions are requirements to be effected by machinists.
7. SCOPE. To train entry level Marines in machining and bench work required for the maintenance of Marine Corps equipment. Principals, procedures, and techniques of machining and hand-working various types of ferrous and nonferrous metals and materials. Fabrication of mechanical parts, reading blue prints and drawings or working from oral instructions. Identification characteristics of metals, and use of hand and measuring tools. Operation of drilling machines, lathes & attachments, milling machines, grinding machines, metal saws, and performing maintenance management procedures.
8. LENGTH (PEACETIME). 74 Training Days
9. CURRICULUM BREAKDOWN (PEACETIME).
  - 555.00 Academic Hours
    - 66.50 Demonstration
    - 17.55 Lecture
    - 330.25 Practical Application
    - 124.50 Performance Exam
    - 16.20 Written Exam
  - 37.00 Administrative Hours
    - 16.00 Administrative
    - 13.00 Commanders Time
    - 8.00 Guided Discussion
10. LENGTH (MOBILIZATION). 60 Training Days
11. CURRICULUM BREAKDOWN (MOBILIZATION). Same as Peacetime.
12. MAXIMUM CLASS CAPACITY. 4
13. OPTIMUM CLASS CAPACITY. 3
14. MINIMUM CLASS CAPACITY. 2
15. CLASS FREQUENCY. 14
16. STUDENT PREREQUISITES.

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SECTION I - COURSE DESCRIPTIVE DATA

- (A) Must have MM score of 105 or higher.  
 (B) Must have normal color vision.

17. MOS RECEIVED. 2161
18. QUOTA CONTROL. Training Command (C475)
19. FUNDING. TECOM (C464)
20. REPORTING INSTRUCTIONS. Students report to the Commanding Officer, Marine Detachment, U.S. Army Ordnance Center & School, Aberdeen Proving Ground, Maryland 21005. All students should report in by 2359 the Wednesday prior to the start date. During working and non-working hours report to Bldg 4403, Detachment Headquarters, Commercial phone 1-800-392-2015 ext: 5703/ or DSN: 298-5703/. Marines will report in Service Alpha's. Privately Owned Vehicles (POV) family members are not authorized. Government Messing and Billeting are available.
21. INSTRUCTOR STAFFING REQUIREMENTS. See Appendix A for Instructor Computation Worksheet.

LN#	GRADE	MOS	BILLET DESCRIPTION	REQUIRED
196A	E7	2161	INSTRUCTOR	1
196B	E6	2161	INSTRUCTOR	2

22. SCHOOL OVERHEAD REQUIREMENTS.

LN#	GRADE	MOS	BILLET DESCRIPTION	REQUIRED
UNK	E6	2100	CURRICULUM DEVELOPERS	3
192B	O4	2102	COMMANDING OFFICER/ MC REP	1
192C	O3E	2102	INSTRUCTOR/XO	1
192D	E8	9999	FIRST SERGEANT	1
192E	E6	0193	ADMIN CHIEF	1
192F	E5	0151	ADMIN CLERK	1
192G	E4	0121	UNIT DIARY CLERK	1
192H	E3	0121	UNIT DIARY CLERK	1
192I	E4	0121	PERS CLERK	1
192J	E3	0121	ADMIN CLERK	3
192K	O3E	2102	CRS DEV SUPERVISOR	1
192L	E7	2111	ACADEMIC COORDINATOR	1
192M	E4	3043	SUPPLY NCO	1
192N	E3	3043	SUPPLY CLERK	1
192O	E6	0369	PLATOON SGT	2
192P	W-4	2120	INST/COURSE DEV	1
199G	E7	3043	EOOR ADMIN/SUPPLY CHIEF	1
199H	E3	3043	EOOR ADMIN/SUPPLY CLERK	1
UNK1	E6	2100	MAT PLT SGT	1
UNK3	E7	2100	S-3 OPERATIONS & TRAINING / SACO	1
UNK4	E7	2100	DETACHMENT GYSGT	1
UNK6	E7	2100	ISC/COMPUTER REPAIR/NETWORK ADMIN	1

Comments Line# UNK: The curriculum developers are Marines who are responsible for the input of information into the CDD/POI and Master Lesson Files. This billet is a full time job and the Marine is taken from one of the platoons.

Comments Line# UNK1 : Marines Awaiting Training, one instructor is tasked with this duty for 6 months out of the year. This billet is a full time job and the Marine is taken from one of the platoons.

Comments Line# UNK3 : This billet is a full time job, who is responsible for all permanent party training and the Marine is taken from one of the platoons.

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SECTION I - COURSE DESCRIPTIVE DATA

Comments Line# UNK4 : The Detachment Gunnery Sergeant is in charge of all the barracks, grounds and maintenance. This billet is a full time job and the Marine is taken from one of the platoons.

Comments Line# UNK6 : The ISC is responsible for all the computer assets and LAN connections throughout the Detachment. This billet is a full time job and the Marine is taken from one of the platoons.

23. TRAINING/EDUCATION SUPPORT REQUIREMENTS.

The following facility requirements are identified for one iteration of this course:

<u>FACILITY</u>	<u>FACILITY ID</u>	<u>SQ FT</u>	<u>REQ'D</u>	<u>ON HAND</u>	<u>SHORT</u>
* GENERAL PURPOSE CLASSROOM A	BLDG 3074	900	10	10	0
* MAINTENANCE BAY	BLDG 3074	1000	6	6	0
MAINTENANCE BAY FOR MACHINIST VAN	BLD 5043	1000	1	1	0

The following materiel requirements are identified for one iteration of this course:

<u>NOMEMCLATURE</u>	<u>NSN</u>	<u>UNIT OF ISSUE</u>	<u>REQ'D</u>	<u>ON HAND</u>	<u>SHORT</u>
*0 TO 1.00 REAMER SET	N/A	EACH	1	1	0
*ANVIL BLACKSMITH	5120-00-618-4901	EACH	2	2	0
*ARBOR PRESS	-	EACH	1	1	0
*ARBOR PRESS	MOD. PHASE 2	EACH	1	1	0
*B-1951 MOBILE MACH. VAN	4940-01-235-5080	EACH	1	1	0
*BOOK CASE, STEEL (BLACK)	7110-00-061-9871	EACH	2	2	0
*BROACHES SET	-	SET	1	1	0
*BROACHING SET (DUMONT)	NO# 10-10A	EACH	1	1	0
*CABINET STORAGE 36WX18DX78H	7125-00-641-5436	EACH	5	5	0
*CABINET STORAGE, (BLACK)	7125-00-764-6129	EACH	3	3	0
*CABINET TOOL MOBILE MECHANIC	5140-00-030-6617	EACH	12	12	0
*CALIPER MICROMETER 2-3 IN	5210-00-221-1945	EACH	12	12	0
*CALIPER SET MICROM OUTSIDE .0001 IN GRAD CALI	5210-00-554-7134	EACH	1	1	0
*CALIPER THREAD 14-18 TPI	5210-00-242-6652	EACH	4	4	0
*CALIPER THREAD 8-13	5210-00-242-6650	EACH	5	5	0
*CALIPER, MICROMETER 1-2 IN	5210-00-243-2933	EACH	8	8	0
*CALIPER, VERNIER GEAR TOOTH 0-1 WIDTH & DEPTH	5210-00-241-3538	EACH	8	8	0
*CALIPERS VERNIER DIAL STARRETT	5210-01-010-4522	EACH	13	13	0
*CASSETTE PLAYER	AC2333	EACH	1	1	0
*CASSETTE RECORDER	5820-00-T01-0PAN	EACH	2	2	0
*DESINTIGRATOR (EDM MACHINE) MODEL 3008	SER. 101893	EACH	1	1	0
*DRILL ELECTRIC PORTABLE 1/2 SKILL	5130-00-889-9002	EACH	4	4	0
*DRILL INDEX SET 1/16 - 1/2	5130-00-293-0983	EACH	8	8	0
*EYE WASH, PORTABLE	--	EACH	3	3	0
*HAMMER DEAD BLOW	5120-01-071-5356	EACH	8	8	0
*HARDNESS TESTER BRINNEL	PIN TESTER	EACH	1	1	0
*HARDNESS TESTER ROCKWELL (FREE WHEEL)	MODEL 103R	EACH	1	1	0

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SECTION I - COURSE DESCRIPTIVE DATA

*INDICATOR DIAL	5210-00-277-8840	EACH	12	12	0
*MICROSCOPE 40X	MOD. 35-450	EACH	1	1	0
*PLATE SURFACE	5210-00-293-3556	EACH	3	3	0
*PROJECTION SLIDE 2	6730-00-T94-0077	EACH	1	1	0
*ROCKWELL HARDNESS TESTER	2030-00-500-0002	EACH	1	1	0
*SOCKET SET 3/8" DRIVE	SOCKET SET 3/8	EACH	12	12	0
*SQUARE COMBINATION 12"	5210-00-078-8949	EACH	5	5	0
*STEEL STORAGE LOCKER	-	EACH	1	1	0
*TAP SHANK DRILL BIT 1/2" TO 1.000" IN 1/64	-	EACH	1	1	0
*TOOL CHEST, MASTER MECHANIC	5140-00-388 3416	EACH	1	1	0
*VERNIER CALIPER MOCK UP	7295-00-T94-0176	EACH	1	1	0
*VIDEO TAPE ANGLE MILLING	-	EACH	1	1	0
*VIDEO TAPE ANGULAR MILLING	-	EACH	1	1	0
*VIDEO TAPE DRILLING	-	EACH	1	1	0
*VIDEO TAPE GEAR TOOTH REPAIR	-	EACH	1	1	0
*VIDEO TAPE GRINDING EXTERNAL	-	EACH	1	1	0
*VIDEO TAPE INDEXING	-	EACH	1	1	0
*VIDEO TAPE INTRODUCTION AND INVENTORY	-	EACH	1	1	0
*VIDEO TAPE KEYWAYS (SQUARE AND WOODRUFF KEYS)	-	EACH	1	1	0
*VIDEO TAPE LATHE OPERATIONS	-	EACH	1	1	0
*VIDEO TAPE PLAIN MILLING	-	EACH	1	1	0
*VIDEO TAPE SIDE MILLING	-	EACH	1	1	0
*VIDEO TAPE SLITTING OPERATIONS	-	EACH	1	1	0
*VIDEO TAPE SLOTTING INTERNAL	-	EACH	1	1	0
*VIDEO TAPE VICE ALIGNMENT	-	EACH	1	1	0
*VIDEO TAPE, LUBRICATION	91-0865	EACH	1	1	0
*VIDEO TAPE, 1 HAND TOOLS	--	EACH	1	1	0
*VIDEO TAPE, 2 HAND TOOLS	--	EACH	1	1	0
*VIDEO TAPE, 3 HAND TOOLS	--	EACH	1	1	0
*VIDEO TAPE, 4 HAND TOOLS	--	EACH	1	1	0
*VIDEO TAPE, DECIMALS AND TOLERANCES	COASTAL	EACH	1	1	0
*VIDEO TAPE, EQUATIONS AND FORMULAS	COASTAL	EACH	1	1	0
*VIDEO TAPE, METAL IDENTIFICATION	--	EACH	1	1	0
*VIDEO TAPE, SHOP DRAWINGS	7020-91-080-0B	EACH	1	1	0
*VIDEO TAPE, SHOP SAFETY	--	EACH	1	1	0
*VIDEO TAPE, TRIGONOMETRIC FUNCTIONS	COASTAL	EACH	1	1	0
*VIDEO TAPE, WHOLE NUMBERS AND FRACTIONS	COASTAL	EACH	1	1	0
*VISE BENCH AND PIPE SWIVEL BASE 4 1/2 W, 5IN	3460-00-277-3504	EACH	5	5	0
*WILSON HARDNESS TESTER (IF ON HAND)	RAMS 2104	EACH	1	1	0
CALIPER, MICROMETER 1-2	5210-00-243-2933	EACH	8	8	0

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SECTION I - COURSE DESCRIPTIVE DATA

IN						
CHAIR ROTERY NONTILTING W/ARMS GRAY/BLACK	7110-00-000-0103	EACH	10	10	0	
CHAIR WITH FOLDING DESK TOP	7110-01-138-3955	EACH	5	5	0	
COOUNTER BORE SET	5133-00-378-3813	EACH	2	2	0	
DESK	--	EACH	10	10	0	
DESK, RIGHT PED (BLACK)	7110-00-149-1624	EACH	1	1	0	
DIE & TAP SET THREAD CUTTING	5136-00-357-7504	EACH	1	1	0	
DIE & TAP THREAD CUTTING	5136-00-357-7494	EACH	2	2	0	
DIE STOCK PIPE	5136-00-221-1095	EACH	4	4	0	
DRILL MACHINE UPRIGHT	3413-00-165-4136	EACH	8	8	0	
GENERAL						
DRILL, ELECTRIC PORT B&D 1/2" CHUCK	5310-00-293-1849	EACH	1	1	0	
EXTRACTOR SET	5120-00-540-1416	EACH	12	12	0	
GAGE DEPTH 0-12	5120-00-221-1932	EACH	1	1	0	
GAGE DEPTH MICROMETER 0-6	5210-00-221-1932	EACH	1	1	0	
GAGE HEIGHT VERNIER	5210-00-687-5777	EACH	12	12	0	
GAGE SCREWPITCH ENGLISH	5210-00-203-7763	EACH	5	5	0	
GAGE, DEPTH, MICROMETER	5210-00-619-4045	EACH	8	8	0	
GAUGE CENTER	5210-00-222-4000	EACH	7	7	0	
GAUGE SCREWPITCH METRIC	5210-00-221-1993	EACH	5	5	0	
GRINDING MACHINE UTILITY	3415-00-255-2683	EACH	12	12	0	
WISSOTA 1 HP MOD E- HAMMER MACHINIST BALL PEEN	5120-01-070-4542	EACH	8	8	0	
HELICOIL 1/2-13	5180-00-051-5024	EACH	5	5	0	
HELICOIL 1/2-20	5180-00-054-7505	EACH	5	5	0	
HELICOIL 10-24	5180-00-935-0731	EACH	5	5	0	
HELICOIL 3/8-16	5180-00-935-0734	EACH	5	5	0	
HELICOIL 3/8-24	5180-00-935-0738	EACH	5	5	0	
HELICOIL 5/16-18	5180-00-935-0733	EACH	5	5	0	
HELICOIL 5/8-11	5180-00-054-7514	EACH	5	5	0	
HELICOIL 7/16-14	5180-00-054-7503	EACH	5	5	0	
HELICOIL 9/16-12	5180-00-059-4829	EACH	5	5	0	
HELICOIL 9/16-18	5180-00-054-7516	EACH	5	5	0	
HYDROLIC PRESS (60 TON)	3444-00-449-7295	EACH	1	1	0	
KEY SET SOCKET HEAD L-TYPE (15PC)	ALLEN SET	EACH	8	8	0	
KEY SET SOCKET HEAD SCREW "T" HANDLE TYPE (10)	SOCKET KEY	EACH	8	8	0	
LATHE ENGINE	3416-01-030-8195	EACH	9	9	0	
MACHINIST HANDBOOK AMERICAN (BLUE)	205-1040	EACH	20	20	0	
MACHINIST VAN B1951	4940-01-235-5080	EACH	1	1	0	
MICROMETER 3-4 IN	5210-00-221-1934	EACH	3	3	0	
MILLING GRINDING SLOTTING ATTACHMENT	3460-00-840-1010	EACH	12	12	0	
MILLING MACHINE ADJUSTABLE MDL 1R-322-1RQ-3-22	3417-00-624-4254	EACH	8	8	0	
MONITOR	7025-00-T96-0018	EACH	1	1	0	
PROJECTION SLIDE	6730-00-T01-0002	EACH	1	1	0	
PROJECTION WALL SCREEN	6730-00-T94-0115	EACH	1	1	0	
SAW BAND METAL CUTTING FLR MTD 16 IN THROAT	3405-00-294-9591	EACH	8	8	0	
SOCKET SET 1/2" DRIVE	SOCKET SET 1/2	EACH	1	1	0	
SOCKET SET 1/4" DRIVE	SOCKET SET 1/4	EACH	1	1	0	

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SECTION I - COURSE DESCRIPTIVE DATA

TABLE AUTO WORK-WOOD TOP 60X25X35	4910-00-543-7772	EACH	7	7	0
TABLE WORK, METAL SURFACE	7195-00-926-5939	EACH	1	1	0
TABLE, WORK, WOOD, 96X28X34	7195-00-285-5908	EACH	6	6	0
THRED PIPE SET	5180-00-357-7514	EACH	1	1	0
TV 25 IN ZENITH	5820-00-T94-0006	EACH	2	2	0
TV STAND	6760NSI	EACH	1	1	0

24. TASK LIST. See Appendix B.

CDD NOTES: This CDD represents a 7 hour day for annex's A and G. The remaining 1 hour is used for either PT or uniform inspections. The remainder of the CDD is based on an 8 hr academic instruction day.

The \* (asterisk) in paragraph 23 represent items that are NOT owned by the Marine Corps and which are used in the combined Army and Marine portions of the course. These items are still required to teach this course.

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SECTION I - COURSE DESCRIPTIVE DATA

APPENDIX A - INSTRUCTOR COMPUTATION WORKSHEET (LOCKSTEP)

SECTION I COURSE DATA

COURSE: A012151 MACHINIST

LOCATION: United States Marine Corps, Marine Detachment, US Army Ordnance Center & School, Aberdeen Proving Ground, MD 21005-5281

PROGRAMMED ANNUAL INPUT (FY 03): 42 LENGTH (AVG CAL DAYS): 100  
 PROGRAMMED NUMBER OF CLASSES/YEAR: 14 LENGTH (TRAINING DAYS): 74  
 SYLLABUS HOURS: 555.00

SECTION II CURRICULUM BREAKOUT

(A)	(B)	(C)	(D)	(E)	(F)
TRAINING SITUATION	MAX CLASS SIZE	MAX RATIO (X:1)	INST REQ	SYLLABUS HOURS	INST MANHOURS
Demonstration	4	4.00	1.00	66.50	66.50
Lecture	4	4.00	1.00	17.55	17.55
Practical Application	4	4.00	1.00	330.25	330.25
Performance Exam	4	4.00	1.00	124.50	124.50
Written Exam	4	4.00	1.00	16.20	16.20

TOTAL INSTRUCTOR MANHOURS PER CLASS(G): 555.00

SECTION III INSTRUCTOR COMPUTATION

TOTAL INSTRUCTOR MANHOURS PER CLASS	x	PROGRAMMED NUMBER OF CLASSES	=	ANNUAL INSTRUCTOR CONTACT HOURS	7770.00
ANNUAL INSTRUCTOR CONTACT HOURS	x	1.26	=	ANNUAL INSTRUCTOR HOURS	9790.20
ANNUAL INSTRUCTOR HOURS	÷	12	=	MONTHLY INSTRUCTOR HOURS	815.85
MONTHLY INSTRUCTOR HOURS	÷	145	=	INSTRUCTORS REQUIRED	5.627 = 6

ICW NOTES: Instructors are tasked with teaching not only basic entry level Marines, but are required to mentor Marines within the course and provide additional support as required by the Detachment. These taskers include Ordnance Officers/Chief's course instructors, chaser for brig/CCU, monitor urinalysis, PT, PFT's, and field day inspections. Progression through the Army Staff & Faculty Development Program, and Marine Corps Professional Education is required.



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SECTION I - COURSE DESCRIPTIVE DATA

APPENDIX B - TASKLIST

DUTY: 2161.01 OPERATION AND ORGANIZATIONAL MAINTENANCE

- TASKS: (S) 2161.01.01 OPERATE A BANDSAW  
(S) 2161.01.02 OPERATE A BENCH GRINDER  
(S) 2161.01.03 OPERATE A HORIZONTAL BAND SAW (CUTOFF SAW)  
(S) 2161.01.05 OPERATE A DRILL PRESS  
(P) 2161.01.10 OPERATE A HYDRAULIC PRESS  
(S) 2161.01.12 SET UP THE LATHE  
(S) 2161.01.13 PERFORM THREADING OPERATIONS  
(S) 2161.01.14 PERFORM LATHE DRILLING OPERATIONS  
(S) 2161.01.15 PERFORM LATHE TURNING OPERATIONS  
(S) 2161.01.17 OPERATE MILLING MACHINE  
(S) 2161.01.20 OPERATE HARDNESS TESTER  
(S) 2161.01.23 OPERATE LATHE MILLING ATTACHMENT/VERSA MILL  
(P) 2161.01.24 OPERATE MACHINIST'S VAN  
(P) 2161.01.25 OPERATE A DIGITAL READ OUT (DRO)  
(S) 2161.01.26 PERFORM KNURLING OPERATIONS

DUTY: 2161.03 EQUIPMENT REPAIR AND FABRICATION

- TASKS: (S) 2161.03.01 EXTRACT BROKEN BOLT, TAP, DRILL BIT, OR STUD  
(S) 2161.03.02 EXTRACT THREAD INSERTS  
(S) 2161.03.04 PREPARE SHOP DRAWING  
(S) 2161.03.05 WELD BANDSAW BLADE  
(S) 2161.03.08 SHARPEN TURNING TOOL BITS  
(S) 2161.03.09 RESHARPEN TWIST DRILL BITS

DUTY: 2161.04 ADMINISTRATIVE FUNCTIONS

- TASKS: (S) 2161.04.04 FOLLOW BASIC SHOP PROCEDURES  
(S) 2161.04.05 FOLLOW BASIC MAINTENANCE PROCEDURES

TASK LIST NOTES: None.

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SECTION II - SUMMARY OF HOURS

PEACETIME (74 TRAINING DAYS)

ACADEMIC TIME

<u>TITLE</u>	<u>HOURS</u>	<u>ANNEX</u>
BASIC SKILLS AND KNOWLEDGE	55.00	A
BENCH OPERATIONS	56.00	B
LATHE OPERATIONS	216.00	C
MILLING MACHINE OPERATIONS	101.00	D
VERSA MILL OPERATIONS	43.00	E
MARINE CORPS UNIQUE	<u>84.00</u>	G
TOTAL ACADEMIC HOURS:	555.00	

ADMINISTRATIVE TIME

IN PROCESSING	8.00	Z
OUT PROCESSING / GRADUATION	8.00	Z
COMMANDERS TIME	13.00	Z
DRIVERS IMPROVEMENT	<u>8.00</u>	Z
TOTAL ADMINISTRATIVE HOURS:	37.00	

SUMMARY (PEACETIME)

ACADEMIC TIME	555.00
ADMINISTRATIVE TIME	<u>37.00</u>
TOTAL ACADEMIC AND ADMINISTRATIVE TIME:	592.00

MOBILIZATION (60 TRAINING DAYS)

Peacetime course length was determined by dividing the total academic and administrative hours by 8. Mobilization course length was determined by dividing the total academic and administrative hours by 10.

## MACHINIST PROGRAM OF INSTRUCTION

### SECTION III - SCOPE OF ANNEXES

A. BASIC SKILLS AND KNOWLEDGE. Upon completion of this block the student will have a basic knowledge of general publications, hazardous materials, basic shop safety, the use of tools, NAVMC forms, the use of mathematics in a machine shop, reading of blueprints and shop drawings, and the identification of metals.

B. BENCH OPERATIONS. The student will receive instruction and show mastery of bench operations through written and practical exams on the following, skills involving machine shop operations involving hand tools specifically; use and care of hacksaws, files, bench utility grinders, drill bits, die tapping & threading, counter-boring and sinking, and thread inserts.

C. LATHE OPERATIONS. The student will receive instruction and show mastery of the operation of lathes through written and practical exams on the following; maintaining the lathe, aligning centers, drilling, turning, filing & polishing, parting, grooving, knurling, boring, reaming, tapers, and threading.

D. MILLING MACHINE OPERATIONS. The student will receive instruction and show mastery of operation of milling machines through written and practical exams on the following; maintaining a milling machine, plain and face milling, sawing and angular milling, indexing, keys and keyways, gear cutting, drilling & boring, straddle milling, and spline milling.

E. VERSA MILL OPERATIONS. The student will receive instruction and show mastery of operation of versa mills through written on the following; maintaining a versa-mill, planing, angular milling, keys and keyways, gear repair, drilling, and grinding.

G. MARINE CORPS UNIQUE. The student will receive instruction and show mastery, through practical exams on: the operation of hardness testers, hydraulic presses, digital readout devices, bandsaws and the machinist van through written and practical exams. This annex will also incorporate a comprehensive end of course practical application involving all subjects previously taught, this allows the formal school to imitate the environment or "day in the life" of a Fleet Marine Force Machinist.

Z. ADMINISTRATIVE. Administrative processing includes Check in, Check out, Graduation, Drivers Improvement, and Commanders time.

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

1. A concept card is developed to describe each academic or administrative block of time during a course. These concept cards are then grouped into subject areas, called annexes, which are summarized in Section III. Annexes A through Y are reserved for academic lessons and exams. Annex Z is reserved for administrative time.
2. The following information is contained on each academic concept card in Section IV:
  - a. Heading. The heading listed at the top of the concept card includes the name of the course, the section of the POI, and the letter and title of the annex to which the lesson or exam is assigned.
  - b. Lesson/Exam ID. This designator is a unique code assigned to this specific lesson or exam within this course.
  - c. Hours. This number (carried to the second decimal place) depicts the amount of time required to conduct the lesson or exam once, even if it is presented multiple times to smaller groups of students.
  - d. Title. This is the title assigned to this lesson or exam. It should refer to the subject matter covered in the lesson or exam when possible.
  - e. Phase (optional). This is a code depicting the phase (e.g., week, month, etc.) of the course during which this lesson or exam takes place.
  - f. Group (optional). This is a code depicting the instructional group or section responsible for teaching or developing this lesson or exam.
  - g. Methods,Hours,S:I Ratio. Displayed on the concept card are codes which symbolize the methods of instruction used to present this lesson or exam. Following each method code is the time (in hours) allocated to that method and the student to instructor ratio associated with that period of time. (The hours and ratios depicted on the concept card are used to determine instructor staffing requirements.) The following is a comprehensive list of methods used in this course and their respective codes:

<u>Method</u>	<u>Code</u>
Administrative	ADMIN
Commanders Time	CMDR
Demonstration	D
Guided Discussion	GD
Lecture	L
Practical Application	PA
Performance Exam	X(P)
Written Exam	X(W)

- h. Media. Displayed on the concept card are codes which symbolize the media used to support this lesson or exam. The following is a comprehensive list of media used in this course and their respective codes:

<u>Medium</u>	<u>Code</u>
Actual Item/Object	AIO
Blackboard	B
Computer	CPU
Handout	HO
Power Point Presentation	PPP
Television	TV
Video Cassette Recorder	VCR
Videotape	VT
White Board	WB
Workbook	WBK

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### SECTION IV - CONCEPT CARDS

i. Learning Objective(s)/Lesson Purpose. Academic concept cards contain either learning objectives or a lesson purpose statement, but not both.

(1) Learning Objective. A learning objective describes a behavior that students are expected to perform following instruction, not necessarily identical to a behavior performed on the job. It also details the conditions under which that behavior is performed and the minimum standards of acceptable performance. A student masters the objective when his or her performance equals or exceeds the standard. (Information concerning student evaluation and mastery is contained in Section V of this POI.)

(a) Terminal Learning Objective (TLO). One, and only one, TLO is written for each task in Section I-B of the POI. The behavior in the TLO duplicates the actual behavior required on the job, modified only if the constraints of the academic environment will not allow it. A TLO should only appear on a concept card for a lesson or exam during which students actually perform the TLO. Each TLO is assigned a numeric designator identical to the designator of its corresponding task in Section I-B, which is identical to the designator of the Individual Training Standard (ITS) from which the task was derived. This designator is located in parentheses at the end of the TLO.

(b) Enabling Learning Objective (ELO). ELOs are designed to teach students the knowledges and skills required for successful performance of the TLOs. Each ELO is placed only on concept cards for lessons or exams during which students actually perform the ELO. Many introductory lessons will contain only ELOs. Each ELO is assigned the same numeric designator as the TLO it supports, followed by a unique combination of one or two letters. This designator is located in parentheses at the end of the ELO. (The first 26 ELOs are assigned the letters "a" through "z" consecutively. If there are more than 26 ELOs, they are assigned the letters "aa" through "az," then "ba" through "bz," etc.)

(2) Lesson Purpose. A lesson purpose statement is recorded on a concept card where no learning objectives are appropriate (e.g., overview, orientation, or enrichment lesson) and the lesson is not to be evaluated. The lesson purpose statement clearly describes the rationale for presenting the lesson.

j. Ammunition Requirements. Whenever a lesson requires the use of ammunition by students or by the instructional staff in support of the lesson, the concept card for that lesson will include a table depicting those requirements. Included for each type of ammunition will be its Department of Defense Identification Code (DODIC), its nomenclature, the average number of rounds used by each student, and the number of support rounds.

k. Notes (optional). This section of the concept card contains any information pertinent to the lesson. Examples of items which may be addressed here are instructor requirements, scheduling notes, special prerequisites, references to tests on which material will be evaluated, etc.

l. References. This section contains the source documents used for development of the lesson or other references which relate to the lesson. At a minimum, it must contain all documents referenced in the learning objectives included on the concept card.

3. The following information is contained on each administrative concept card in Section IV:

a. Heading. The heading listed at the top of the concept card includes the name of the course, the section of the POI, and the fact that this concept card is part of Annex Z, Administrative Time.

b. Event ID. This designator is a unique code assigned to this administrative event within the course.

## MACHINIST PROGRAM OF INSTRUCTION

### SECTION IV - CONCEPT CARDS

c. Hours. This number (carried to the second decimal place) depicts the amount of administrative time required for this event. If this is a repeating event, one concept card may indicate the cumulative hours associated with this event throughout the course.

d. Event. This is a short description of the administrative event.

e. Notes (optional). This section of the concept card contains any information pertinent to the administrative block of time.

4. The following pages contain useful information for locating the learning objectives and lessons that make up this course.

a. Location of Learning Objectives Report. This report lists, by learning objective designator, all learning objectives developed for this course. It also identifies every concept card on which each learning objective is included.

b. Academic and Administrative Summaries. These reports list, by annex, all academic and administrative concept cards in Section IV. Within each annex the concept cards are listed in lesson identifier order. The information provided for each entry includes Identifier, Title, Hours, and Type [Task-oriented lesson (T), Lesson Purpose lesson (LP), Exam (E), or Administrative Time (ADM)]. A subtotal of hours is provided for each annex and for all academic and administrative concept cards. Total POI hours are listed at the end of the Administrative Summary.

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
2161.01.01	G	21610G05	Operate a Bandsaw
	G	21610G08	Job Performance Test and Review 21610G05 Through 2161G06
	G	21610G09	End of Course Review
2161.01.01a	G	21610G05	Operate a Bandsaw
2161.01.01b	G	21610G05	Operate a Bandsaw
2161.01.01c	G	21610G05	Operate a Bandsaw
2161.01.01d	G	21610G05	Operate a Bandsaw
2161.01.01e	G	21610G05	Operate a Bandsaw
2161.01.01f	G	21610G05	Operate a Bandsaw
2161.01.01g	G	21610G05	Operate a Bandsaw
2161.01.01h	G	21610G05	Operate a Bandsaw
2161.01.01i	G	21610G05	Operate a Bandsaw
2161.01.02	B	21610B03	Bench Utility Grinder
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
	G	21610G09	End of Course Review
2161.01.02a	B	21610B03	Bench Utility Grinder
2161.01.02b	B	21610B03	Bench Utility Grinder
2161.01.02c	B	21610B03	Bench Utility Grinder
2161.01.02d	B	21610B03	Bench Utility Grinder
2161.01.02e	B	21610B03	Bench Utility Grinder
2161.01.02f	B	21610B03	Bench Utility Grinder
2161.01.03	G	21610G06	Horizontal Band Saw
	G	21610G08	Job Performance Test and Review 21610G05 Through 2161G06
	G	21610G09	End of Course Review
2161.01.03a	G	21610G06	Horizontal Band Saw
2161.01.03b	G	21610G06	Horizontal Band Saw
2161.01.03c	G	21610G06	Horizontal Band Saw
2161.01.03d	G	21610G06	Horizontal Band Saw

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LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
2161.01.05	B	21610B05	Drilling and Hand Tapping
	B	21610B07	Counterboring and Countersinking
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
	G	21610G09	End of Course Review
2161.01.05a	B	21610B05	Drilling and Hand Tapping
2161.01.05b	B	21610B05	Drilling and Hand Tapping
	B	21610B07	Counterboring and Countersinking
2161.01.05c	B	21610B05	Drilling and Hand Tapping
	B	21610B07	Counterboring and Countersinking
2161.01.05d	B	21610B05	Drilling and Hand Tapping
	B	21610B07	Counterboring and Countersinking
2161.01.05e	B	21610B05	Drilling and Hand Tapping
	B	21610B07	Counterboring and Countersinking
2161.01.05f	B	21610B05	Drilling and Hand Tapping
	B	21610B07	Counterboring and Countersinking
2161.01.05g	B	21610B07	Counterboring and Countersinking
2161.01.05h	B	21610B07	Counterboring and Countersinking
2161.01.10	G	21610G02	Hydraulic Press
	G	21610G04	Job Knowledge Test and Review 21610G01 Through 21610G03
	G	21610G09	End of Course Review
2161.01.10a	G	21610G02	Hydraulic Press
2161.01.10b	G	21610G02	Hydraulic Press
2161.01.10c	G	21610G02	Hydraulic Press
2161.01.10d	G	21610G02	Hydraulic Press
2161.01.12	A	21610A06	Identification of Metals and Lubricants
	C	21610C01	Maintain the Lathe
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
	G	21610G09	End of Course Review
2161.01.12a	C	21610C01	Maintain the Lathe
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11

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SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
2161.01.12b	C	21610C01	Maintain the Lathe
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.12c	C	21610C01	Maintain the Lathe
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.12d	C	21610C01	Maintain the Lathe
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.12e	A	21610A06	Identification of Metals and Lubricants
	A	21610A09	Job Knowledge Test and Review 21610A04 Through 21610A08
2161.01.12f	C	21610C01	Maintain the Lathe
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.13	B	21610B06	Hand Die Threading
	C	21610C19	Threads
	C	21610C20	Methods of Measuring Threads
	C	21610C22	External Thread Cutting
	C	21610C23	Internal Thread Cutting
	C	21610C24	Metric Thread Cutting
	C	21610C28	Internal Thread Cutting on Lathe
	C	21610C29	External Thread Cutting on Lathe
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13a	G	21610G09	End of Course Review
	C	21610C19	Threads
	C	21610C22	External Thread Cutting
2161.01.13b	C	21610C23	Internal Thread Cutting
	C	21610C24	Metric Thread Cutting
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
	C	21610C22	External Thread Cutting

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SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
	C	21610C32	21610C30 Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13c	C	21610C22	External Thread Cutting
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13d	C	21610C23	Internal Thread Cutting
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13e	C	21610C24	Metric Thread Cutting
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13f	C	21610C19	Threads
2161.01.13g	C	21610C19	Threads
2161.01.13h	C	21610C20	Methods of Measuring Threads
2161.01.13i	B	21610B06	Hand Die Threading
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
	C	21610C28	Internal Thread Cutting on Lathe
	C	21610C29	External Thread Cutting on Lathe
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13j	B	21610B06	Hand Die Threading
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
	C	21610C28	Internal Thread Cutting on Lathe
	C	21610C29	External Thread Cutting on Lathe
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13k	C	21610C28	Internal Thread Cutting on Lathe
	C	21610C29	External Thread Cutting on Lathe
	C	21610C31	Job Knowledge Test and Review 21610C14 Through

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LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
	C	21610C32	21610C30 Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13l	B	21610B06	Hand Die Threading
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
2161.01.13m	C	21610C28	Internal Thread Cutting on Lathe
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.13n	C	21610C29	External Thread Cutting on Lathe
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.14	C	21610C09	Drilling
	C	21610C10	Boring
	C	21610C11	Reaming
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
	C	21610C14	Tapers
	C	21610C18	Taper Boring with Taper Attachment
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
	G	21610G09	End of Course Review
2161.01.14a	C	21610C09	Drilling
	C	21610C10	Boring
	C	21610C11	Reaming
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
	C	21610C18	Taper Boring with Taper Attachment
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.14b	C	21610C09	Drilling
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11

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LO	ANNEX	LESSON ID	LESSON TITLE
2161.01.14c	C	21610C10	Boring
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.14d	C	21610C11	Reaming
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.14e	C	21610C14	Tapers
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.14f	C	21610C18	Taper Boring with Taper Attachment
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15	B	21610B02	Layout and Hand Filing
	C	21610C02	Align Live and Dead Centers
	C	21610C03	Facing and Center Drilling
	C	21610C04	Straight and Shoulder Turning
	C	21610C05	Filing and Polishing
	C	21610C06	Parting
	C	21610C07	Grooving
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
	C	21610C15	Taper Turning with Compound Rest
	C	21610C16	Taper Turning with Taper Attachment
	C	21610C17	Taper Turning with the Tail Stock
	C	21610C25	Eccentric Turning
	C	21610C26	Faceplate Boring
C	21610C27	Turn Convex and Concave Radii	
2161.01.15a	C	21610C02	Align Live and Dead Centers
	C	21610C03	Facing and Center Drilling
	C	21610C04	Straight and Shoulder Turning
	C	21610C05	Filing and Polishing
	C	21610C06	Parting
	C	21610C07	Grooving
	C	21610C12	Job Knowledge Test and Review 21610C01 Through

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LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
			21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
	C	21610C15	Taper Turning with Compound Rest
	C	21610C16	Taper Turning with Taper Attachment
	C	21610C17	Taper Turning with the Tail Stock
	C	21610C25	Eccentric Turning
	C	21610C26	Faceplate Boring
	C	21610C27	Turn Convex and Concave Radii
	C	21610C30	Facing a Square
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15b	C	21610C02	Align Live and Dead Centers
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.15c	C	21610C03	Facing and Center Drilling
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.15d	C	21610C04	Straight and Shoulder Turning
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.15e	C	21610C05	Filing and Polishing
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.15f	C	21610C05	Filing and Polishing
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.15g	C	21610C06	Parting
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through 21610C11
2161.01.15h	C	21610C07	Grooving
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
	C	21610C13	Job Performance Test and Review 21610C01 Through

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LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
			21610C11
2161.01.15i	C	21610C15	Taper Turning with Compound Rest
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15j	C	21610C16	Taper Turning with Taper Attachment
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15k	C	21610C17	Taper Turning with the Tail Stock
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15l	C	21610C25	Eccentric Turning
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15m	C	21610C26	Faceplate Boring
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15n	C	21610C27	Turn Convex and Concave Radii
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15o	C	21610C27	Turn Convex and Concave Radii
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15p	C	21610C30	Facing a Square
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.01.15q	B	21610B02	Layout and Hand Filing
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08

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LO	ANNEX	LESSON ID	LESSON TITLE	
2161.01.15r	B	21610B02	Layout and Hand Filing	
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08	
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08	
2161.01.17	B	21610B01	Layout and Hacksawing	
	D	21610D01	Maintain the Milling Machine	
	D	21610D02	Plain and Face Milling	
	D	21610D03	Sawing and Angular Milling	
	D	21610D04	Indexing	
	D	21610D05	Mill a Square and Hexagon	
	D	21610D06	Keys and Keyways	
	D	21610D07	Mill Keyways	
	D	21610D08	Gear Cutting	
	D	21610D09	Drilling and Boring	
	D	21610D10	Straddle Milling	
	D	21610D11	Spline Milling	
	D	21610D12	Job Knowledge Test and Review 21610D01 Through 21610D11	
2161.01.17a	D	21610D13	Job Performance Test and Review 21610D01 Through 21610D11	
	G	21610G09	End of Course Review	
2161.01.17a	D	21610D01	Maintain the Milling Machine	
2161.01.17b	D	21610D01	Maintain the Milling Machine	
	D	21610D02	Plain and Face Milling	
	D	21610D03	Sawing and Angular Milling	
	D	21610D04	Indexing	
	D	21610D05	Mill a Square and Hexagon	
	D	21610D07	Mill Keyways	
	D	21610D09	Drilling and Boring	
	D	21610D10	Straddle Milling	
	D	21610D11	Spline Milling	
	2161.01.17c	D	21610D02	Plain and Face Milling
		D	21610D02	Plain and Face Milling
2161.01.17d	D	21610D02	Plain and Face Milling	
2161.01.17e	D	21610D03	Sawing and Angular Milling	
2161.01.17f	D	21610D06	Keys and Keyways	
2161.01.17g	D	21610D06	Keys and Keyways	
2161.01.17h	D	21610D07	Mill Keyways	
2161.01.17i	D	21610D09	Drilling and Boring	
2161.01.17j	D	21610D09	Drilling and Boring	
2161.01.17k	D	21610D10	Straddle Milling	
2161.01.17l	D	21610D04	Indexing	

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
2161.01.17m	D	21610D01	Maintain the Milling Machine
2161.01.17n	B	21610B01	Layout and Hacksawing
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
2161.01.17o	B	21610B01	Layout and Hacksawing
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
2161.01.17p	D	21610D03	Sawing and Angular Milling
2161.01.17q	D	21610D05	Mill a Square and Hexagon
2161.01.17r	D	21610D05	Mill a Square and Hexagon
2161.01.17s	D	21610D11	Spline Milling
2161.01.17t	D	21610D08	Gear Cutting
2161.01.17u	D	21610D08	Gear Cutting
2161.01.17v	D	21610D08	Gear Cutting
2161.01.17w	D	21610D08	Gear Cutting
2161.01.17x	D	21610D08	Gear Cutting
2161.01.20	G	21610G01	Hardness Testers
	G	21610G04	Job Knowledge Test and Review 21610G01 Through 21610G03
	G	21610G09	End of Course Review
2161.01.20a	G	21610G01	Hardness Testers
2161.01.20b	G	21610G01	Hardness Testers
2161.01.20c	G	21610G01	Hardness Testers
2161.01.23	E	21610E01	Operate Versa Mill
	E	21610E02	Plain Milling with the Versa Mill
	E	21610E03	Angular Milling with the Versa Mill
	E	21610E04	Keyway Milling with the Versa Mill
	E	21610E05	Drilling with the Versa Mill
	E	21610E06	Internal Keyway Cutting with the Versa Mill
	E	21610E07	Gear Repair with the Versa Mill
	E	21610E08	External Grinding with the Versa Mill
	E	21610E09	Job Knowledge Test and Review 21610E01 Through 21610E08
	G	21610G09	End of Course Review

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
2161.01.23a	E	21610E01	Operate Versa Mill
2161.01.23b	E	21610E01	Operate Versa Mill
	E	21610E02	Plain Milling with the Versa Mill
	E	21610E03	Angular Milling with the Versa Mill
	E	21610E04	Keyway Milling with the Versa Mill
	E	21610E05	Drilling with the Versa Mill
	E	21610E06	Internal Keyway Cutting with the Versa Mill
	E	21610E07	Gear Repair with the Versa Mill
	E	21610E08	External Grinding with the Versa Mill
2161.01.23c	E	21610E02	Plain Milling with the Versa Mill
2161.01.23d	E	21610E03	Angular Milling with the Versa Mill
2161.01.23e	E	21610E04	Keyway Milling with the Versa Mill
2161.01.23f	E	21610E05	Drilling with the Versa Mill
2161.01.23g	E	21610E06	Internal Keyway Cutting with the Versa Mill
2161.01.23h	E	21610E07	Gear Repair with the Versa Mill
2161.01.23i	E	21610E08	External Grinding with the Versa Mill
2161.01.23j	E	21610E04	Keyway Milling with the Versa Mill
2161.01.23k	E	21610E01	Operate Versa Mill
2161.01.24	G	21610G10	Introduction to the Machinist Van
	G	21610G11	Setup and Close Machinist Van
	G	21610G12	Inventory the Machinist Van
	G	21610G13	Perform PMCS on the Machinist Van
	G	21610G14	Operation of the Machinist Van Equipment
	G	21610G15	Machinist Van Record Jacket
2161.01.24a	G	21610G10	Introduction to the Machinist Van
2161.01.24b	G	21610G11	Setup and Close Machinist Van
2161.01.24c	G	21610G11	Setup and Close Machinist Van
2161.01.24d	G	21610G11	Setup and Close Machinist Van
2161.01.24e	G	21610G12	Inventory the Machinist Van
2161.01.24f	G	21610G12	Inventory the Machinist Van
2161.01.24g	G	21610G13	Perform PMCS on the Machinist Van
2161.01.24h	G	21610G14	Operation of the Machinist Van Equipment
2161.01.24i	G	21610G14	Operation of the Machinist Van Equipment
2161.01.24j	G	21610G14	Operation of the Machinist Van Equipment

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
2161.01.24k	G	21610G14	Operation of the Machinist Van Equipment
2161.01.24l	G	21610G14	Operation of the Machinist Van Equipment
2161.01.24m	G	21610G15	Machinist Van Record Jacket
2161.01.24n	G	21610G15	Machinist Van Record Jacket
2161.01.25	G	21610G03	Digital Read Out (DRO)
	G	21610G04	Job Knowledge Test and Review 21610G01 Through 21610G03
	G	21610G09	End of Course Review
2161.01.25a	G	21610G03	Digital Read Out (DRO)
2161.01.25b	G	21610G03	Digital Read Out (DRO)
2161.01.25c	G	21610G03	Digital Read Out (DRO)
2161.01.25d	G	21610G03	Digital Read Out (DRO)
2161.01.25e	G	21610G03	Digital Read Out (DRO)
2161.01.26	C	21610C08	Knurling
	C	21610C12	Job Knowledge Test and Review 21610C01 Through 21610C11
2161.01.26a	C	21610C08	Knurling
2161.01.26b	C	21610C08	Knurling
2161.01.26c	C	21610C08	Knurling
2161.03.01	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
	G	21610G09	End of Course Review
2161.03.01a	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.01b	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.01c	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.01d	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.01e	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.02	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
	G	21610G09	End of Course Review
2161.03.02a	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.02b	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.02c	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.02d	B	21610B08	Install and Remove Plugs, Studs, Screws and Inserts
2161.03.04	A	21610A05	Blueprint Drafting
	A	21610A07	Shop Drawings and Sketches
	A	21610A09	Job Knowledge Test and Review 21610A04 Through 21610A08
	G	21610G09	End of Course Review
2161.03.04a	A	21610A07	Shop Drawings and Sketches
2161.03.04b	A	21610A07	Shop Drawings and Sketches
2161.03.04c	A	21610A07	Shop Drawings and Sketches
2161.03.04d	A	21610A05	Blueprint Drafting
2161.03.04e	A	21610A05	Blueprint Drafting
2161.03.05	G	21610G05	Operate a Bandsaw
	G	21610G08	Job Performance Test and Review 21610G05 Through 2161G06
	G	21610G09	End of Course Review
2161.03.05a	G	21610G05	Operate a Bandsaw
2161.03.05b	G	21610G05	Operate a Bandsaw
2161.03.05c	G	21610G05	Operate a Bandsaw
2161.03.05d	G	21610G05	Operate a Bandsaw
2161.03.05e	G	21610G05	Operate a Bandsaw
2161.03.05f	G	21610G05	Operate a Bandsaw
2161.03.08	B	21610B04	Sharpen Twist Drills
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
	C	21610C21	Grind Threading Tool Bit
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
	G	21610G09	End of Course Review
2161.03.08a	B	21610B04	Sharpen Twist Drills
	B	21610B09	Job Knowledge Test and Review 21610B01 Through

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

LOCATION OF LEARNING OBJECTIVES REPORT

LO	ANNEX	LESSON ID	LESSON TITLE
	B	21610B10	21610B08 Job Performance Test and Review 21610B01 Through 21610B08
2161.03.08b	B	21610B04	Sharpen Twist Drills
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
2161.03.08c	C	21610C21	Grind Threading Tool Bit
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.03.08d	C	21610C21	Grind Threading Tool Bit
	C	21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30
	C	21610C32	Job Performance Test and Review 21610C14 Through 21610C30
2161.03.09	B	21610B04	Sharpen Twist Drills
	B	21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08
	B	21610B10	Job Performance Test and Review 21610B01 Through 21610B08
	G	21610G09	End of Course Review
2161.03.09a	B	21610B04	Sharpen Twist Drills
2161.03.09b	B	21610B04	Sharpen Twist Drills
2161.04.04	G	21610G09	End of Course Review
2161.04.05	A	21610A04	Technical Publications
	G	21610G09	End of Course Review
	A	2161AA04	Marine Corps Publications
	A	2161AA05	Maintenance Administration
	A	2161AA06	Calibrations
2161.04.05a	A	21610A04	Technical Publications
	A	2161AA04	Marine Corps Publications
2161.04.05b	A	2161AA04	Marine Corps Publications
2161.04.05d	A	2161AA06	Calibrations
2161.04.05e	A	2161AA06	Calibrations
2161.04.05f	A	2161AA06	Calibrations
2161.04.05j	A	2161AA05	Maintenance Administration

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

ACADEMIC SUMMARY

IDENTIFIER	TITLE	HRS	TYPE
ANNEX A - BASIC SKILLS AND KNOWLEDGE			
21610A01	Machine Shop Fundamentals	4.50	LP
21610A02	Shop Mathematics	16.00	LP
21610A03	Job Knowledge Test and Review for 21610A02	2.00	LP
21610A04	Technical Publications	2.00	T
21610A05	Blueprint Drafting	2.00	T
21610A06	Identification of Metals and Lubricants	5.00	T
21610A07	Shop Drawings and Sketches	3.50	T
21610A08	Machine and Precision Tools	8.00	LP
21610A09	Job Knowledge Test and Review 21610A04 Through 21610A08	2.00	E
21610A10	Inspection and Maintenance	3.00	LP
2161AA01	Course Introduction	0.50	LP
2161AA02	Shop Tour	0.50	LP
2161AA03	Introduction to Mathematics	1.50	LP
2161AA04	Marine Corps Publications	1.00	T
2161AA05	Maintenance Administration	2.50	T
2161AA06	Calibrations	1.00	T
		Annex Total :	55.00
ANNEX B - BENCH OPERATIONS			
21610B01	Layout and Hacksawing	2.00	T
21610B02	Layout and Hand Filing	7.00	T
21610B03	Bench Utility Grinder	7.00	T
21610B04	Sharpen Twist Drills	6.00	T
21610B05	Drilling and Hand Tapping	4.00	T
21610B06	Hand Die Threading	2.00	T
21610B07	Counterboring and Countersinking	2.00	T
21610B08	Install and Remove Plugs, Studs, Screws and Inserts	8.00	T
21610B09	Job Knowledge Test and Review 21610B01 Through 21610B08	1.60	E
21610B10	Job Performance Test and Review 21610B01 Through 21610B08	12.90	E
21610B11	Inspection and Maintenance	3.50	LP
		Annex Total :	56.00
ANNEX C - LATHE OPERATIONS			
21610C01	Maintain the Lathe	5.00	T
21610C02	Align Live and Dead Centers	5.00	T
21610C03	Facing and Center Drilling	7.00	T
21610C04	Straight and Shoulder Turning	18.00	T
21610C05	Filing and Polishing	4.00	T
21610C06	Parting	4.00	T
21610C07	Grooving	7.50	T
21610C08	Knurling	4.50	T
21610C09	Drilling	5.00	T
21610C10	Boring	5.00	T
21610C11	Reaming	4.00	T
21610C12	Job Knowledge Test and Review 21610C01 Through	2.20	E

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

ACADEMIC SUMMARY

IDENTIFIER	TITLE	HRS	TYPE
	21610C11		
21610C13	Job Performance Test and Review 21610C01 Through 21610C11	22.80	E
21610C14	Tapers	2.00	T
21610C15	Taper Turning with Compound Rest	4.00	T
21610C16	Taper Turning with Taper Attachment	10.00	T
21610C17	Taper Turning with the Tail Stock	9.00	T
21610C18	Taper Boring with Taper Attachment	7.00	T
21610C19	Threads	2.00	T
21610C20	Methods of Measuring Threads	2.00	T
21610C21	Grind Threading Tool Bit	3.50	T
21610C22	External Thread Cutting	11.50	T
21610C23	Internal Thread Cutting	6.00	T
21610C24	Metric Thread Cutting	10.50	T
21610C25	Eccentric Turning	5.00	T
21610C26	Faceplate Boring	4.00	T
21610C27	Turn Convex and Concave Radii	4.50	T
21610C28	Internal Thread Cutting on Lathe	3.00	T
21610C29	External Thread Cutting on Lathe	3.00	T
21610C30	Facing a Square	5.00	T
21610C31	Job Knowledge Test and Review 21610C14 Through 21610C30	2.00	E
21610C32	Job Performance Test and Review 21610C14 Through 21610C30	24.00	E
21610C33	Inspection and Maintenance	4.00	LP

Annex Total : 216.00

ANNEX D - MILLING MACHINE OPERATIONS

21610D01	Maintain the Milling Machine	3.00	T
21610D02	Plain and Face Milling	10.00	T
21610D03	Sawing and Angular Milling	8.00	T
21610D04	Indexing	4.00	T
21610D05	Mill a Square and Hexagon	8.00	T
21610D06	Keys and Keyways	3.00	T
21610D07	Mill Keyways	9.00	T
21610D08	Gear Cutting	10.00	T
21610D09	Drilling and Boring	6.00	T
21610D10	Straddle Milling	3.00	T
21610D11	Spline Milling	6.00	T
21610D12	Job Knowledge Test and Review 21610D01 Through 21610D11	2.00	E
21610D13	Job Performance Test and Review 21610D01 Through 21610D11	24.00	E
21610D14	Inspection and Maintenance	5.00	LP

Annex Total : 101.00

ANNEX E - VERSA MILL OPERATIONS

21610E01	Operate Versa Mill	2.00	T
21610E02	Plain Milling with the Versa Mill	6.00	T
21610E03	Angular Milling with the Versa Mill	7.00	T
21610E04	Keyway Milling with the Versa Mill	6.00	T

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

ACADEMIC SUMMARY

IDENTIFIER	TITLE	HRS	TYPE
21610E05	Drilling with the Versa Mill	6.00	T
21610E06	Internal Keyway Cutting with the Versa Mill	5.00	T
21610E07	Gear Repair with the Versa Mill	5.00	T
21610E08	External Grinding with the Versa Mill	4.00	T
21610E09	Job Knowledge Test and Review 21610E01 Through 21610E08	2.00	E

Annex Total : 43.00

ANNEX G - MARINE CORPS UNIQUE

21610G01	Hardness Testers	2.00	T
21610G02	Hydraulic Press	2.00	T
21610G03	Digital Read Out (DRO)	1.00	T
21610G04	Job Knowledge Test and Review 21610G01 Through 21610G03	2.00	E
21610G05	Operate a Bandsaw	6.00	T
21610G06	Horizontal Band Saw	1.00	T
21610G08	Job Performance Test and Review 21610G05 Through 21610G06	3.25	E
21610G09	End of Course Review	38.75	E
21610G10	Introduction to the Machinist Van	0.50	T
21610G11	Setup and Close Machinist Van	5.00	T
21610G12	Inventory the Machinist Van	8.50	T
21610G13	Perform PMCS on the Machinist Van	3.25	T
21610G14	Operation of the Machinist Van Equipment	7.00	T
21610G15	Machinist Van Record Jacket	3.75	T

Annex Total : 84.00

Total Academic Hours : 555.00

MACHINIST PROGRAM OF INSTRUCTION

SECTION IV - CONCEPT CARDS

ADMINISTRATIVE SUMMARY

<u>IDENTIFIER</u>	<u>TITLE</u>	<u>HRS</u>	<u>TYPE</u>
ANNEX Z - ADMINISTRATIVE			
21610Z01	In Processing	8.00	ADM
21610Z02	Out Processing / Graduation	8.00	ADM
21610Z03	Commanders Time	13.00	ADM
21610Z04	Drivers Improvement	8.00	ADM

Total Administrative Hours : 37.00

Total POI Hours : 592.00

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A01

HOURS: 4.50

TITLE: Machine Shop Fundamentals

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
PA	1.50	4:1
X(W)	1.50	4:1

MEDIA: TV, VCR, VT

LESSON PURPOSE:

During this class the following will be discussed: Current department operations directives, shop procedures, fire and safety practices, introduction to current related publications as they apply to the machinist and operations security. In addition you will take a math diagnostic test, physical demand test and spot quiz.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A02

HOURS: 16.00

TITLE: Shop Mathematics

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	5.00	4:1
PA	11.00	4:1

MEDIA: B, HO

LESSON PURPOSE:

This lesson reinforces the mathematics taught in previous lesson, but will encompass a broader spectrum and at a more technical level. The math that is taught will be progressive and will relate directly to the mathematics that are needed to be proficient in a machine shop.

REFERENCE

1. New American Machinist Handbook
2. Shop Math

REFERENCE #

- MACHINIST HANBOOK  
TC 9-515

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A03

HOURS: 2.00

TITLE: Job Knowledge Test and Review for 21610A02

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
X(W)	2.00	4:1

MEDIA: WB

LESSON PURPOSE:

Math Pre-test to evaluate student comprehension level of necessary mathematics skill.

REFERENCE

REFERENCE #

1. New American Machinist Handbook

MACHINIST HANBOOK

2. Shop Math

TC 9-515

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A04

HOURS: 2.00

TITLE: Technical Publications

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	1.00	4:1

MEDIA: AIO, HO

TERMINAL LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, follow basic maintenance procedures, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05)

ENABLING LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, identify the types of publications, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05a)

REFERENCE

REFERENCE #

1. USMC Technical Publication System
2. Catalog of Publications

MCO P5215.17  
NAVMC 2761

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A05

HOURS: 2.00

TITLE: Blueprint Drafting

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	1.00	4:1

MEDIA: TV, VCR, VT, WB, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, prepare shop drawing, to ensure drawing is prepared to specification per the references. (2161.03.04)

ENABLING LEARNING OBJECTIVE(S):

1. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, identify the components of a blueprint, to ensure drawing is prepared to specification per the references. (2161.03.04d)
2. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, read a blueprint, to ensure drawing is prepared to specification per the references. (2161.03.04e)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. GENERAL DRAFTING                   | FM 5-553          |
| 2. New American Machinist Handbook    | MACHINIST HANBOOK |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A06

HOURS: 5.00

TITLE: Identification of Metals and Lubricants

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	2.50	4:1
PA	2.50	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12)

ENABLING LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, identify the types of lubricants, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12e)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A07

HOURS: 3.50

TITLE: Shop Drawings and Sketches

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
PA	2.00	4:1

MEDIA: TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, prepare shop drawing, to ensure drawing is prepared to specification per the references. (2161.03.04)

ENABLING LEARNING OBJECTIVE(S):

1. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, identify the types of drawings, to ensure drawing is prepared to specification per the references. (2161.03.04a)
2. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, identify the components of a drawing, to ensure drawing is prepared to specification per the references. (2161.03.04b)
3. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, measure an object, to ensure drawing is prepared to specification per the references. (2161.03.04c)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. GENERAL DRAFTING                   | FM 5-553          |
| 2. New American Machinist Handbook    | MACHINIST HANBOOK |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A08

HOURS: 8.00

TITLE: Machine and Precision Tools

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	2.50	4:1
PA	5.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

LESSON PURPOSE:

This class will cover the characteristics of tools and how to perform preventive maintenance on the tools that Marines will use while in this school.

REFERENCE

REFERENCE #

- |   |                   |
|---|-------------------|
| 1. Occupational Safety and Health Standards, Hazard Communication | 29 CFR 1910.1200  |
| 2. Applicable Stock List SL-3                                     | APPLICABLE SL-3   |
| 3. DOD Hazard Communication Program                               | DOD INST 6050.5_  |
| 4. New American Machinist Handbook                                | MACHINIST HANBOOK |
| 5. Equipment Operator's Manual                                    | OPERATOR'S MANUAL |
| 6. Naval Aviation Maintenance Program                             | OPNAV 4790.2      |
| 7. Fundamentals of Machine Tools                                  | TC 9-524          |
| 8. Use and Care of Hand Measuring Tools                           | TM 10209-10/1     |
| 9. Ground Equipment Record Procedures                             | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

EXAM ID: 21610A09

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610A04 Through 21610A08

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
X(W)	2.00	4:1

MEDIA: WB

TERMINAL LEARNING OBJECTIVE(S):

1. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, prepare shop drawing, to ensure drawing is prepared to specification per the references. (2161.03.04)

ENABLING LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, identify the types of lubricants, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12e)

REFERENCE

REFERENCE #

- |   |                   |
|---|-------------------|
| 1. GENERAL DRAFTING                     | FM 5-553          |
| 2. New American Machinist Handbook      | MACHINIST HANBOOK |
| 3. Equipment Operator's Manual          | OPERATOR'S MANUAL |
| 4. Naval Aviation Maintenance Program   | OPNAV 4790.2      |
| 5. Fundamentals of Machine Tools        | TC 9-524          |
| 6. Use and Care of Hand Measuring Tools | TM 10209-10/1     |
| 7. Ground Equipment Record Procedures   | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 21610A10

HOURS: 3.00

TITLE: Inspection and Maintenance

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
PA	3.00	4:1

MEDIA: AIO

LESSON PURPOSE:

This will introduce the student to the PMCS requirements that the following annexes will utilize to ensure that the machinery is serviceable.

REFERENCE

REFERENCE #

1. Applicable Equipment Technical Publications

APPLICABLE TM

2. Equipment Owner's Manual

OWNER'S MANUAL

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 2161AA01

HOURS: 0.50

TITLE: Course Introduction

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.50	4:1

MEDIA: AIO

LESSON PURPOSE:

This lesson introduces Marines to the concept and operations of a Machine shop. This will consist of a general overview of the course and what is required from the students.

REFERENCE

REFERENCE #

1. New American Machinist Handbook

MACHINIST HANBOOK

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 2161AA02

HOURS: 0.50

TITLE: Shop Tour

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1

MEDIA: AIO

LESSON PURPOSE:

To familiarize students with the areas contained within the machine shop. This tour will illustrate the fire evacuation routes, locations of muster areas, location of safety equipment, off limits areas, and all annex classrooms that the students will be assigned for instruction.

REFERENCE

REFERENCE #

1. New American Machinist Handbook

MACHINIST HANBOOK

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 2161AA03

HOURS: 1.50

TITLE: Introduction to Mathematics

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.50	4:1
PA	1.00	4:1

MEDIA: AIO

LESSON PURPOSE:

This lesson serves to refresh the student of basic mathematics skills that would be expected of the target population group. This lesson also serves to identify students that require additional instruction to strengthen mathematical skills needed for successful completion of this course, and continued success in the Fleet Marine Force. The MCI Mathematics for Marines will be issued at this time.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 2161AA04

HOURS: 1.00

TITLE: Marine Corps Publications

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.25	4:1
PA	0.75	4:1

MEDIA: AIO, CPU, HO, PPP, WB

TERMINAL LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, follow basic maintenance procedures, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05)

ENABLING LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, identify the types of publications, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05a)
2. Given equipment repair records, forms and the references, know how to use publications, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05b)

REFERENCE

REFERENCE #

- |  |                   |
|--|-------------------|
| 1. Table of Marine Corps Ground Equipment Resource Reporting (MCGERR)    | MCBUL 3000        |
| 2. USMC Technical Publication System                                     | MCO P5215.17      |
| 3. Index of Authorized Publications for Equipment Support                | SL-1-2            |
| 4. Index of Authorized Publications for Equipment Support                | SL-1-3            |
| 5. Organizational and Intermediate Maintenance Rifle, 5.56-MM, M16A2 W/E | TM 05538C-23&P/2A |
| 6. Ground Equipment Record Procedures                                    | TM 4700-15/1      |
| 7. MIMMS AIS Field Maintenance Procedures                                | UM 4790-5         |
| 8. Publication Library Management System                                 | UM-PLMS           |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 2161AA05

HOURS: 2.50

TITLE: Maintenance Administration

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	1.00	4:1
PA	1.50	4:1

MEDIA: AIO, CPU, HO, PPP, WB

TERMINAL LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, follow basic maintenance procedures, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05)

ENABLING LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, complete selected NAVMC forms, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05j)

REFERENCE

REFERENCE #

- |   |              |
|---|--------------|
| 1. Federal Logistics Database                             | FEDLOG       |
| 2. Consumer Level Policy Manual                           | MCO 4400.150 |
| 3. Index of Authorized Publications for Equipment Support | SL-1-2       |
| 4. Index of Authorized Publications for Equipment Support | SL-1-3       |
| 5. Ground Equipment Record Procedures                     | TM 4700-15/1 |
| 6. MIMMS AIS Field Maintenance Procedures                 | UM 4790-5    |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX A - BASIC SKILLS AND KNOWLEDGE

LESSON ID: 2161AA06

HOURS: 1.00

TITLE: Calibrations

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.50	4:1
PA	0.50	4:1

MEDIA: CPU, PPP, WB

TERMINAL LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, follow basic maintenance procedures, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05)

ENABLING LEARNING OBJECTIVE(S):

1. Given equipment repair records, forms and the references, identify the equipment that requires calibration, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05d)
2. Given equipment repair records, forms and the references, identify calibration control records, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05e)
3. Given equipment repair records, forms and the references, identify equipment calibration intervals, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05f)

REFERENCE

REFERENCE #

- |  |               |
|--|---------------|
| 1. Applicable Equipment Technical Publications | APPLICABLE TM |
| 2. Calibration Requirements USMC TMDE CAMP     | TI 4733-15/1  |
| 3. Ground Equipment Record Procedures          | TM 4700-15/1  |
| 4. MIMMS AIS Field Maintenance Procedures      | UM 4790-5     |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B01

HOURS: 2.00

TITLE: Layout and Hacksawing

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	1.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, layout work, to ensure that milling operations are performed to required specifications per the references. (2161.01.17n)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, hacksaw a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17o)

NOTE(S):

Allows students to practice primary hand tool techniques before advancing to more sophisticated and complicated operations on power machinery. The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B02

HOURS: 7.00

TITLE: Layout and Hand Filing

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	6.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, layout a workpiece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15q)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, hand file a workpiece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15r)

NOTE(S):

Allows students to practice primary hand tool techniques before advancing to more sophisticated and complicated operations on power machinery. The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B03

HOURS: 7.00

TITLE: Bench Utility Grinder

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
PA	5.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, operate a bench grinder, to ensure that the bench grinder will be operated safely per the references. (2161.01.02)

ENABLING LEARNING OBJECTIVE(S):

1. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, identify the components and characteristics of a bench grinder, to ensure the bench grinder will be operated safely per the references. (2161.01.02a)
2. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, lay out work, to ensure the bench grinder will be operated safely, per the references. (2161.01.02b)
3. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, perform preventive maintenance check on grinder, to ensure the bench grinder will be operated safely per the references. (2161.01.02c)
4. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, start bench grinder, to ensure the bench grinder will be operated safely per the references. (2161.01.02d)
5. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, dress grinding wheel, to ensure the bench grinder will be operated safely per the references. (2161.01.02e)
6. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, grind material, to ensure the bench grinder will be operated safely per the references. (2161.01.02f)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B03

HOURS: 7.00

TITLE: Bench Utility Grinder

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |  |                   |
|--|-------------------|
| 1. New American Machinist Handbook                   | MACHINIST HANBOOK |
| 2. AEROSPACE METALS - GENERAL DATA AND USAGE FACTORS | NAVAIR 01-1A-9    |
| 3. Equipment Operator's Manual                       | OPERATOR'S MANUAL |
| 4. Ground Equipment Record Procedures                | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B04

HOURS: 6.00

TITLE: Sharpen Twist Drills

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	5.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, sharpen turning tool bits, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08)
2. Given bench grinder, tool bit, drill gage, safety equipment, automated systems with internet access, and the current authorized technical information, resharpen twist drill bits, to ensure bits are resharpened to specification and references. (2161.03.09)

ENABLING LEARNING OBJECTIVE(S):

1. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, identify the characteristics of a twist drill, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08a)
2. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, grind turning tool bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08b)
3. Given bench grinder, tool bit, drill gage, safety equipment, automated systems with internet access, and the current authorized technical information, resharpen drill bit to desired angle, to ensure bits are resharpened to specification and references. (2161.03.09a)
4. Given bench grinder, tool bit, drill gage, safety equipment, automated systems with internet access, and the current authorized technical information, check finished bit with gauge, to ensure bits are resharpened to specification and references. (2161.03.09b)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B04

HOURS: 6.00

TITLE: Sharpen Twist Drills

4. Ground Equipment Record Procedures

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B05

HOURS: 4.00

TITLE: Drilling and Hand Tapping

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	3.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, operate a drill press, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05)

ENABLING LEARNING OBJECTIVE(S):

1. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, identify the components and characteristics of the drill press, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05a)
2. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, lay out work, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05b)
3. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, perform preventive maintenance check on drilling machine and bits, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05c)
4. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, set up drill, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05d)
5. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, tap a thread, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05e)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B05

HOURS: 4.00

TITLE: Drilling and Hand Tapping

6. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, drill a hole, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05f)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B06

HOURS: 2.00

TITLE: Hand Die Threading

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	1.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine type of threads to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13i)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, select proper taps and/or dies for operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13j)
3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, tap a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13l)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

1. New American Machinist Handbook

REFERENCE #

MACHINIST HANBOOK

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B06

HOURS: 2.00

TITLE: Hand Die Threading

- |                                       |                   |
|---------------------------------------|-------------------|
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B07

HOURS: 2.00

TITLE: Counterboring and Countersinking

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	1.50	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, operate a drill press, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05)

ENABLING LEARNING OBJECTIVE(S):

1. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, lay out work, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05b)
2. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, perform preventive maintenance check on drilling machine and bits, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05c)
3. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, set up drill, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05d)
4. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, tap a thread, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05e)
5. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, drill a hole, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05f)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B07

HOURS: 2.00

TITLE: Counterboring and Countersinking

6. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, counterbore a workpiece, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05g)
  
7. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, countersink a workpiece, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05h)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |  |                   |
|--|-------------------|
| 1. Applicable Equipment Technical Publications | APPLICABLE TM     |
| 2. New American Machinist Handbook             | MACHINIST HANBOOK |
| 3. Equipment Operator's Manual                 | OPERATOR'S MANUAL |
| 4. Naval Aviation Maintenance Program          | OPNAV 4790.2      |
| 5. Equipment Owner's Manual                    | OWNER'S MANUAL    |
| 6. Ground Equipment Record Procedures          | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B08

HOURS: 8.00

TITLE: Install and Remove Plugs, Studs, Screws and Inserts

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	7.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, extract broken bolt, tap, drill bit, or stud, to ensure broken machine part is extracted correctly per the references. (2161.03.01)
2. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, extract thread inserts, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02)

ENABLING LEARNING OBJECTIVE(S):

1. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine what must be extracted, to ensure broken machine part is extracted correctly per the references. (2161.03.01a)
2. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine appropriate extraction procedure, to ensure broken machine part is extracted correctly per the references. (2161.03.01b)
3. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, use an extractor, to ensure broken machine part is extracted correctly per the references. (2161.03.01c)
4. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, extract broken part, to ensure broken machine part is extracted correctly per the references. (2161.03.01d)
5. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box,

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B08

HOURS: 8.00

TITLE: Install and Remove Plugs, Studs, Screws and Inserts

automated systems with internet access, and the current authorized technical information, recondition threaded hole as required, to ensure broken machine part is extracted correctly per the references. (2161.03.01e)

6. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, identify the components of a thread insert, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02a)
7. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, extract thread insert, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02b)
8. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, retap threads, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02c)
9. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, replace thread insert, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02d)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Equipment Owner's Manual           | OWNER'S MANUAL    |
| 5. Fundamentals of Machine Tools      | TC 9-524          |
| 6. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

EXAM ID: 21610B09

HOURS: 1.60

TITLE: Job Knowledge Test and Review 21610B01 Through 21610B08

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(W)	1.40	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, operate a bench grinder, to ensure that the bench grinder will be operated safely per the references. (2161.01.02)
2. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, operate a drill press, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05)
3. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, extract broken bolt, tap, drill bit, or stud, to ensure broken machine part is extracted correctly per the references. (2161.03.01)
4. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, extract thread inserts, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02)
5. Given bench grinder, tool bit, drill gage, safety equipment, automated systems with internet access, and the current authorized technical information, sharpen twist drill bits, to ensure bits are sharpened to specification and references. (2161.03.09)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, layout a workpiece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15q)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, hand file a workpiece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15r)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

EXAM ID: 21610B09

HOURS: 1.60

TITLE: Job Knowledge Test and Review 21610B01 Through 21610B08

3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, layout work, to ensure that milling operations are performed to required specifications per the references. (2161.01.17n)
4. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, hacksaw a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17o)
5. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, identify the characteristics of a twist drill, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08a)
6. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, grind turning tool bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08b)
7. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine type of threads to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13i)
8. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, select proper taps and/or dies for operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13j)
9. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, tap a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13l)

REFERENCE

1. New American Machinist Handbook

REFERENCE #

MACHINIST HANBOOK

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

EXAM ID: 21610B09

HOURS: 1.60

TITLE: Job Knowledge Test and Review 21610B01 Through 21610B08

- |  |                   |
|--|-------------------|
| 2. AEROSPACE METALS - GENERAL DATA AND USAGE FACTORS | NAVAIR 01-1A-9    |
| 3. Equipment Operator's Manual                       | OPERATOR'S MANUAL |
| 4. Naval Aviation Maintenance Program                | OPNAV 4790.2      |
| 5. Fundamentals of Machine Tools                     | TC 9-524          |
| 6. Ground Equipment Record Procedures                | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

EXAM ID: 21610B10

HOURS: 12.90

TITLE: Job Performance Test and Review 21610B01 Through 21610B08

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(P)	12.70	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, operate a bench grinder, to ensure that the bench grinder will be operated safely per the references. (2161.01.02)
2. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, operate a drill press, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05)
3. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, extract broken bolt, tap, drill bit, or stud, to ensure broken machine part is extracted correctly per the references. (2161.03.01)
4. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, extract thread inserts, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02)
5. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, sharpen turning tool bits, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08)
6. Given bench grinder, tool bit, drill gage, safety equipment, automated systems with internet access, and the current authorized technical information, resharpen twist drill bits, to ensure bits are resharpened to specification and references. (2161.03.09)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, layout a workpiece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15q)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

EXAM ID: 21610B10

HOURS: 12.90

TITLE: Job Performance Test and Review 21610B01 Through 21610B08

requiring turning, automated systems with internet access, and the current authorized technical information, hand file a workpiece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15r)

3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, layout work, to ensure that milling operations are performed to required specifications per the references. (2161.01.17n)
4. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, hacksaw a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17o)
5. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, identify the characteristics of a twist drill, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08a)
6. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, grind turning tool bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08b)
7. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine type of threads to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13i)
8. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, select proper taps and/or dies for operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13j)
9. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, tap a workpiece, to ensure the device cuts internal or

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

EXAM ID: 21610B10

HOURS: 12.90

TITLE: Job Performance Test and Review 21610B01 Through 21610B08

external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.131)

REFERENCE

REFERENCE #

- |  |                   |
|--|-------------------|
| 1. New American Machinist Handbook                   | MACHINIST HANBOOK |
| 2. AEROSPACE METALS - GENERAL DATA AND USAGE FACTORS | NAVAIR 01-1A-9    |
| 3. Equipment Operator's Manual                       | OPERATOR'S MANUAL |
| 4. Naval Aviation Maintenance Program                | OPNAV 4790.2      |
| 5. Fundamentals of Machine Tools                     | TC 9-524          |
| 6. Ground Equipment Record Procedures                | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX B - BENCH OPERATIONS

LESSON ID: 21610B11

HOURS: 3.50

TITLE: Inspection and Maintenance

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
PA	3.50	4:1

MEDIA: AIO

LESSON PURPOSE:

During this part of the class the Marines will prepare the class area for the next class this includes PMCS of the equipment and ensuring that the metal stock is ready to be issued to the next class.

REFERENCE

1. Equipment Operator's Manual
2. Ground Equipment Record Procedures

REFERENCE #

OPERATOR'S MANUAL  
TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C01

HOURS: 5.00

TITLE: Maintain the Lathe

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
L	0.50	4:1
PA	3.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12)

ENABLING LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, identify the components and characteristics of the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12a)
2. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine type of operation that must be performed, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12b)
3. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine type of holding device or devices required to perform operation, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12c)
4. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform required lathe procedures, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12d)
5. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, conduct equipment PMCS, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12f)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C01

HOURS: 5.00

TITLE: Maintain the Lathe

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Equipment Owner's Manual           | OWNER'S MANUAL    |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C02

HOURS: 5.00

TITLE: Align Live and Dead Centers

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
L	0.50	4:1
PA	3.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, align centers, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15b)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C03

HOURS: 7.00

TITLE: Facing and Center Drilling

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
L	0.50	4:1
PA	5.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, face and center drill work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15c)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C04

HOURS: 18.00

TITLE: Straight and Shoulder Turning

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
L	0.50	4:1
PA	16.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn straight and shoulders on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15d)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C05

HOURS: 4.00

TITLE: Filing and Polishing

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	3.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, file outside diameters on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15e)
3. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, polish outside diameters on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15f)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

1. New American Machinist Handbook
2. Equipment Operator's Manual

- MACHINIST HANBOOK
- OPERATOR'S MANUAL

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C05

HOURS: 4.00

TITLE: Filing and Polishing

3. Naval Aviation Maintenance Program

OPNAV 4790.2

4. Ground Equipment Record Procedures

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C06

HOURS: 4.00

TITLE: Parting

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	3.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, part solid stock, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15g)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C07

HOURS: 7.50

TITLE: Grooving

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
PA	6.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, cut square grooves in a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15h)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C08

HOURS: 4.50

TITLE: Knurling

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
PA	3.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, material to knurl, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform knurling operations, to ensure the device knurls on material to required specifications per the references. (2161.01.26)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, material to knurl, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine specifications for type of knurl to be cut, to ensure the device knurls on material to required specifications per the references. (2161.01.26a)
2. Given lathe with attachments, measuring equipment, material to knurl, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure the device knurls on material to required specifications per the references. (2161.01.26b)
3. Given lathe with attachments, measuring equipment, material to knurl, machinist's tool box, automated systems with internet access, and the current authorized technical information, knurl a workpiece, to ensure the device knurls on material to required specifications per the references. (2161.01.26c)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Equipment Owner's Manual           | OWNER'S MANUAL    |
| 5. Fundamentals of Machine Tools      | TC 9-524          |
| 6. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C08

HOURS: 4.50

TITLE: Knurling

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C09

HOURS: 5.00

TITLE: Drilling

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	4.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, drill holes in a work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14b)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C10

HOURS: 5.00

TITLE: Boring

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	4.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, bore hole in a work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14c)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C11

HOURS: 4.00

TITLE: Reaming

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	3.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, ream internal hole in work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14d)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C12

HOURS: 2.20

TITLE: Job Knowledge Test and Review 21610C01 Through 21610C11

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(W)	2.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14)
3. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)
4. Given lathe with attachments, measuring equipment, material to knurl, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform knurling operations, to ensure the device knurls on material to required specifications per the references. (2161.01.26)

ENABLING LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, identify the components and characteristics of the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12a)
2. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine type of operation that must be performed, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12b)
3. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C12

HOURS: 2.20

TITLE: Job Knowledge Test and Review 21610C01 Through 21610C11

type of holding device or devices required to perform operation, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12c)

4. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform required lathe procedures, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12d)
5. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, conduct equipment PMCS, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12f)
6. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
7. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, drill holes in a work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14b)
8. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, bore hole in a work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14c)
9. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, ream internal hole in work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14d)
10. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current

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SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C12

HOURS: 2.20

TITLE: Job Knowledge Test and Review 21610C01 Through 21610C11

authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)

11. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, align centers, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15b)
12. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, face and center drill work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15c)
13. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn straight and shoulders on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15d)
14. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, file outside diameters on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15e)
15. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, polish outside diameters on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15f)
16. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, part solid stock, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15g)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C12

HOURS: 2.20

TITLE: Job Knowledge Test and Review 21610C01 Through 21610C11

17. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, cut square grooves in a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15h)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Equipment Owner's Manual           | OWNER'S MANUAL    |
| 5. Fundamentals of Machine Tools      | TC 9-524          |
| 6. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C13

HOURS: 22.80

TITLE: Job Performance Test and Review 21610C01 Through 21610C11

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(P)	22.60	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14)
3. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, identify the components and characteristics of the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12a)
2. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine type of operation that must be performed, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12b)
3. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine type of holding device or devices required to perform operation, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12c)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C13

HOURS: 22.80

TITLE: Job Performance Test and Review 21610C01 Through 21610C11

4. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform required lathe procedures, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12d)
  
5. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, conduct equipment PMCS, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12f)
  
6. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
  
7. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, drill holes in a work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14b)
  
8. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, bore hole in a work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14c)
  
9. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, ream internal hole in work piece, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14d)
  
10. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C13

HOURS: 22.80

TITLE: Job Performance Test and Review 21610C01 Through 21610C11

11. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, align centers, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15b)
12. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, face and center drill work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15c)
13. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn straight and shoulders on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15d)
14. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, file outside diameters on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15e)
15. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, polish outside diameters on a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15f)
16. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, part solid stock, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15g)
17. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, cut square grooves in a work piece, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C13

HOURS: 22.80

TITLE: Job Performance Test and Review 21610C01 Through 21610C11

specifications, per the references. (2161.01.15h)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C14

HOURS: 2.00

TITLE: Tapers

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
L	0.50	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, demonstrate how to use a taper, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14e)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C15

HOURS: 4.00

TITLE: Taper Turning with Compound Rest

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	3.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the compound rest, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15i)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C16

HOURS: 10.00

TITLE: Taper Turning with Taper Attachment

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
L	0.50	4:1
PA	8.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the taper attachment, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15j)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C17

HOURS: 9.00

TITLE: Taper Turning with the Tail Stock

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	8.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the tailstock, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are to required specifications, per the references. (2161.01.15k)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C18

HOURS: 7.00

TITLE: Taper Boring with Taper Attachment

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	6.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references.  
(2161.01.14)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, use the taper attachment for internal boring, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14f)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C19

HOURS: 2.00

TITLE: Threads

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	1.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine specifications for type of thread to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13a)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, identify the different types of threads, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13f)
3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, identify the use of threads, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13g)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C19

HOURS: 2.00

TITLE: Threads

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C20

HOURS: 2.00

TITLE: Methods of Measuring Threads

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	1.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, identify the methods of measuring threads, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13h)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C21

HOURS: 3.50

TITLE: Grind Threading Tool Bit

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	3.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, sharpen turning tool bits, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08)

ENABLING LEARNING OBJECTIVE(S):

1. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, identify the characteristics of a threading bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08c)
2. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, grind a threading bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08d)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C22

HOURS: 11.50

TITLE: External Thread Cutting

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.50	4:1
PA	10.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine specifications for type of thread to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13a)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13b)
3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, external thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13c)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C22

HOURS: 11.50

TITLE: External Thread Cutting

1. New American Machinist Handbook
2. Equipment Operator's Manual
3. Naval Aviation Maintenance Program
4. Ground Equipment Record Procedures

MACHINIST HANBOOK

OPERATOR'S MANUAL

OPNAV 4790.2

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C23

HOURS: 6.00

TITLE: Internal Thread Cutting

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	5.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine specifications for type of thread to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13a)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13b)
3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, internal thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13d)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C23

HOURS: 6.00

TITLE: Internal Thread Cutting

1. New American Machinist Handbook
2. Equipment Operator's Manual
3. Naval Aviation Maintenance Program
4. Ground Equipment Record Procedures

MACHINIST HANBOOK

OPERATOR'S MANUAL

OPNAV 4790.2

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C24

HOURS: 10.50

TITLE: Metric Thread Cutting

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
L	0.50	4:1
PA	9.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine specifications for type of thread to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13a)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13b)
3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, metric thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13e)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C24

HOURS: 10.50

TITLE: Metric Thread Cutting

1. New American Machinist Handbook
2. Equipment Operator's Manual
3. Naval Aviation Maintenance Program
4. Ground Equipment Record Procedures

MACHINIST HANBOOK

OPERATOR'S MANUAL

OPNAV 4790.2

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C25

HOURS: 5.00

TITLE: Eccentric Turning

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	4.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform eccentric turning, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.151)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C26

HOURS: 4.00

TITLE: Faceplate Boring

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	3.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform faceplate boring, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15m)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C27

HOURS: 4.50

TITLE: Turn Convex and Concave Radii

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	3.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn convex radii, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15n)
3. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn concave radii, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15o)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

1. New American Machinist Handbook
2. Equipment Operator's Manual

REFERENCE #

- MACHINIST HANBOOK  
OPERATOR'S MANUAL

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C27

HOURS: 4.50

TITLE: Turn Convex and Concave Radii

3. Naval Aviation Maintenance Program

OPNAV 4790.2

4. Ground Equipment Record Procedures

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C28

HOURS: 3.00

TITLE: Internal Thread Cutting on Lathe

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	2.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine type of threads to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13i)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, select proper taps and/or dies for operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13j)
3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe for threading operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13k)
4. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform internal threading, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C28

HOURS: 3.00

TITLE: Internal Thread Cutting on Lathe

(2161.01.13m)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C29

HOURS: 3.00

TITLE: External Thread Cutting on Lathe

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	2.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine type of threads to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13i)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, select proper taps and/or dies for operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13j)
3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe for threading operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13k)
4. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform external threading, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C29

HOURS: 3.00

TITLE: External Thread Cutting on Lathe

(2161.01.13n)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C30

HOURS: 5.00

TITLE: Facing a Square

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
PA	5.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)
2. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, face a square, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15p)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C31

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610C14 Through 21610C30

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(W)	1.80	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14)
3. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)
4. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, sharpen turning tool bits, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine specifications for type of thread to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13a)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C31

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610C14 Through 21610C30

material to required specifications using thread per inch or revolutions per inch method. (2161.01.13b)

3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, external thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13c)
4. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, internal thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13d)
5. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, metric thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13e)
6. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine type of threads to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13i)
7. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, select proper taps and/or dies for operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13j)
8. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe for threading operation, to ensure the device

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C31

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610C14 Through 21610C30

cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13k)

9. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform internal threading, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13m)
10. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform external threading, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13n)
11. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
12. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, demonstrate how to use a taper, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14e)
13. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, use the taper attachment for internal boring, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14f)
14. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)

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SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C31

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610C14 Through 21610C30

15. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the compound rest, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15i)
16. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the taper attachment, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15j)
17. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the tailstock, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are to required specifications, per the references. (2161.01.15k)
18. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform eccentric turning, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15l)
19. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform faceplate boring, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15m)
20. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn convex radii, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15n)
21. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn concave radii, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C31

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610C14 Through 21610C30

references. (2161.01.15o)

22. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, face a square, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15p)
23. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, identify the characteristics of a threading bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08c)
24. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, grind a threading bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08d)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

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SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C32

HOURS: 24.00

TITLE: Job Performance Test and Review 21610C14 Through 21610C30

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(P)	23.80	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)
2. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14)
3. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)
4. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, sharpen turning tool bits, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08)

ENABLING LEARNING OBJECTIVE(S):

1. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine specifications for type of thread to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13a)
2. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on

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SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C32

HOURS: 24.00

TITLE: Job Performance Test and Review 21610C14 Through 21610C30

material to required specifications using thread per inch or revolutions per inch method. (2161.01.13b)

3. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, external thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13c)
4. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, internal thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13d)
5. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, metric thread cut a workpiece, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13e)
6. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, determine type of threads to be cut, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13i)
7. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, select proper taps and/or dies for operation, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13j)
8. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, set up lathe for threading operation, to ensure the device

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C32

HOURS: 24.00

TITLE: Job Performance Test and Review 21610C14 Through 21610C30

cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13k)

9. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform internal threading, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13m)
10. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform external threading, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13n)
11. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with required attachments, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14a)
12. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, demonstrate how to use a taper, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14e)
13. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, use the taper attachment for internal boring, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14f)
14. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, set lathe and accessories for required operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15a)

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SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C32

HOURS: 24.00

TITLE: Job Performance Test and Review 21610C14 Through 21610C30

15. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the compound rest, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15i)
16. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the taper attachment, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15j)
17. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform taper turning with the tailstock, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are to required specifications, per the references. (2161.01.15k)
18. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform eccentric turning, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15l)
19. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform faceplate boring, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15m)
20. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn convex radii, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15n)
21. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, turn concave radii, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

EXAM ID: 21610C32

HOURS: 24.00

TITLE: Job Performance Test and Review 21610C14 Through 21610C30

references. (2161.01.15o)

22. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, face a square, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15p)
23. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, identify the characteristics of a threading bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08c)
24. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, grind a threading bit, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08d)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX C - LATHE OPERATIONS

LESSON ID: 21610C33

HOURS: 4.00

TITLE: Inspection and Maintenance

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
PA	4.00	4:1

MEDIA: AIO

LESSON PURPOSE:

During this part of the class the Marines will prepare the class area for the next class this includes PMCS of the equipment and ensuring that the metal stock is ready to be issued to the next class.

REFERENCE

1. Equipment Operator's Manual
2. Ground Equipment Record Procedures

REFERENCE #

OPERATOR'S MANUAL  
TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D01

HOURS: 3.00

TITLE: Maintain the Milling Machine

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	2.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, identify the components of the milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17a)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, conduct equipment PMCS, to ensure that milling operations are performed to required specifications per the references. (2161.01.17m)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D01

HOURS: 3.00

TITLE: Maintain the Milling Machine

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D02

HOURS: 10.00

TITLE: Plain and Face Milling

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	9.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform plain milling, to ensure that milling operations are performed to required specifications per the references. (2161.01.17c)
3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform face milling, to ensure that milling operations are performed to required specifications per the references. (2161.01.17d)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D03

HOURS: 8.00

TITLE: Sawing and Angular Milling

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	7.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform sawing milling, to ensure that milling operations are performed to required specifications per the references. (2161.01.17e)
3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform angular milling, to ensure that milling operations are performed to required specifications per the references. (2161.01.17p)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D04

HOURS: 4.00

TITLE: Indexing

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	1.50	4:1
PA	2.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, index a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.171)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 2. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 3. Fundamentals of Machine Tools      | TC 9-524          |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D05

HOURS: 8.00

TITLE: Mill a Square and Hexagon

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	7.50	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, mill a square on a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17q)
3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, mill a hexagon on a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17r)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D06

HOURS: 3.00

TITLE: Keys and Keyways

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	2.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, identify the types of keys, to ensure that milling operations are performed to required specifications per the references. (2161.01.17f)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, compute keyway dimensions, to ensure that milling operations are performed to required specifications per the references. (2161.01.17g)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D07

HOURS: 9.00

TITLE: Mill Keyways

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	8.50	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, mill keyways on a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17h)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D08

HOURS: 10.00

TITLE: Gear Cutting

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	9.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, determine type of gear to be cut, to ensure that milling operations are performed to required specifications per the references. (2161.01.17t)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform gear cutting operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17u)
3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, compute spur gear dimensions, to ensure that milling operations are performed to required specifications per the references. (2161.01.17v)
4. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, machine a spur gear, to ensure that milling operations are performed to required specifications per the references. (2161.01.17w)
5. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, ensure gear meets required specifications, to ensure that milling operations are performed to required specifications per the references. (2161.01.17x)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D08

HOURS: 10.00

TITLE: Gear Cutting

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D09

HOURS: 6.00

TITLE: Drilling and Boring

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	5.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform drilling on a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17i)
3. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform boring on a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17j)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D10

HOURS: 3.00

TITLE: Straddle Milling

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	2.50	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, perform straddle milling, to ensure that milling operations are performed to required specifications per the references. (2161.01.17k)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D11

HOURS: 6.00

TITLE: Spline Milling

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	5.00	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

ENABLING LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up milling machine to perform required operation, to ensure that milling operations are performed to required specifications per the references. (2161.01.17b)
2. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, mill a spline on a workpiece, to ensure that milling operations are performed to required specifications per the references. (2161.01.17s)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

EXAM ID: 21610D12

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610D01 Through 21610D11

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(W)	1.80	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

EXAM ID: 21610D13

HOURS: 24.00

TITLE: Job Performance Test and Review 21610D01 Through 21610D11

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(P)	23.80	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX D - MILLING MACHINE OPERATIONS

LESSON ID: 21610D14

HOURS: 5.00

TITLE: Inspection and Maintenance

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
PA	5.00	4:1

MEDIA: AIO

LESSON PURPOSE:

During this part of the class the Marines will prepare the class area for the next class this includes PMCS of the equipment and ensuring that the metal stock is ready to be issued to the next class.

REFERENCE

REFERENCE #

1. New American Machinist Handbook
2. Equipment Operator's Manual
3. Ground Equipment Record Procedures

MACHINIST HANBOOK  
OPERATOR'S MANUAL  
TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E01

HOURS: 2.00

TITLE: Operate Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	1.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, identify the components of the versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23a)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
3. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, conduct equipment PMCS, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23k)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

1. New American Machinist Handbook
2. Equipment Operator's Manual

MACHINIST HANBOOK  
OPERATOR'S MANUAL

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E01

HOURS: 2.00

TITLE: Operate Versa Mill

3. Naval Aviation Maintenance Program

OPNAV 4790.2

4. Fundamentals of Machine Tools

TC 9-524

5. Ground Equipment Record Procedures

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E02

HOURS: 6.00

TITLE: Plain Milling with the Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	5.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, perform plain milling on a workpiece, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23c)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E03

HOURS: 7.00

TITLE: Angular Milling with the Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	6.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, perform angular milling on a workpiece, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23d)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E04

HOURS: 6.00

TITLE: Keyway Milling with the Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	5.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, perform woodruff key cutting on a workpiece, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23e)
3. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, perform square keyway milling on a workpiece, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23j)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

1. New American Machinist Handbook
2. Equipment Operator's Manual

- MACHINIST HANBOOK
- OPERATOR'S MANUAL

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E04

HOURS: 6.00

TITLE: Keyway Milling with the Versa Mill

3. Naval Aviation Maintenance Program

OPNAV 4790.2

4. Fundamentals of Machine Tools

TC 9-524

5. Ground Equipment Record Procedures

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E05

HOURS: 6.00

TITLE: Drilling with the Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	5.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, drill on a workpiece, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23f)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E06

HOURS: 5.00

TITLE: Internal Keyway Cutting with the Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	4.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, perform internal keyway cutting on a workpiece, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23g)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E07

HOURS: 5.00

TITLE: Gear Repair with the Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
PA	4.50	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, repair a gear, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23h)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

LESSON ID: 21610E08

HOURS: 4.00

TITLE: External Grinding with the Versa Mill

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	3.00	4:1

MEDIA: AIO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)

ENABLING LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, set up lathe with milling attachment for desired operation, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23b)
2. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, perform external grinding on a workpiece, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23i)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Fundamentals of Machine Tools      | TC 9-524          |
| 5. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX E - VERSA MILL OPERATIONS

EXAM ID: 21610E09

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610E01 Through 21610E08

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.20	4:1
X(W)	1.80	4:1

MEDIA: AIO, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references.  
(2161.01.23)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2      |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G01

HOURS: 2.00

TITLE: Hardness Testers

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
PA	1.00	4:1

MEDIA: AIO, HO

TERMINAL LEARNING OBJECTIVE(S):

1. Given hardness tester, specifications, material to be tested, automated systems with internet access, and the current authorized technical information, operate hardness tester, to ensure the material is tested as specified per the references. (2161.01.20)

ENABLING LEARNING OBJECTIVE(S):

1. Given hardness tester, specifications, material to be tested, automated systems with internet access, and the current authorized technical information, identify the components of the hardness tester, to ensure the material is tested as specified per the references. (2161.01.20a)
2. Given hardness tester, specifications, material to be tested, automated systems with internet access, and the current authorized technical information, perform preventive maintenance on the hardness tester, to ensure the material is tested as specified per the references. (2161.01.20b)
3. Given hardness tester, specifications, material to be tested, automated systems with internet access, and the current authorized technical information, conduct hardness test, to ensure the material is tested as specified per the references. (2161.01.20c)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Fundamentals of Machine Tools      | TC 9-524          |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G02

HOURS: 2.00

TITLE: Hydraulic Press

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1
L	1.00	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given an hydraulic press, material or equipment requiring pressing in or out, automated systems with internet access, and the current authorized technical information, operate a hydraulic press, to ensure that the pressing operations are completed safety and project is completed according to design, specifications, and the references. (2161.01.10)

ENABLING LEARNING OBJECTIVE(S):

1. Given an hydraulic press, material or equipment requiring pressing in or out, automated systems with internet access, and the current authorized technical information, identify the components and characteristics of the hydraulic press, to ensure that the pressing operations are completed safety and project is completed according to design, specifications, and the references. (2161.01.10a)
2. Given an hydraulic press, material or equipment requiring pressing in or out, automated systems with internet access, and the current authorized technical information, set up hydraulic press, to ensure that the pressing operations are completed safety and project is completed according to design, specifications, and the references. (2161.01.10b)
3. Given an hydraulic press, material or equipment requiring pressing in or out, automated systems with internet access, and the current authorized technical information, perform pressing operation, to ensure that the pressing operations are completed safety and project is completed according to design, specifications, and the references. (2161.01.10c)
4. Given an hydraulic press, material or equipment requiring pressing in or out, automated systems with internet access, and the current authorized technical information, conduct equipment PMCS, to ensure that the pressing operations are completed safety and project is completed according to design, specifications, and the references. (2161.01.10d)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

1. New American Machinist Handbook

MACHINIST HANBOOK

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G02

HOURS: 2.00

TITLE: Hydraulic Press

2. Equipment Operator's Manual

OPERATOR'S MANUAL

3. Naval Aviation Maintenance Program

OPNAV 4790.2

4. Ground Equipment Record Procedures

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G03

HOURS: 1.00

TITLE: Digital Read Out (DRO)

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, operate a digital read out (dro), to ensure that operations are performed to required specifications per the references. (2161.01.25)

ENABLING LEARNING OBJECTIVE(S):

1. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, identify the components and characteristics of the digital read out, to ensure that operations are performed to required specifications per the references. (2161.01.25a)
2. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, zero display, to ensure that operations are performed to required specifications per the references. (2161.01.25b)
3. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, use edge finder/cutting tool to set absolute zero, to ensure that operations are performed to required specifications per the references.. (2161.01.25c)
4. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, set absolute zero using tool offset, to ensure that operations are performed to required specifications per the references.. (2161.01.25d)
5. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, change the position of absolute zero, to ensure that operations are performed to required specifications per the references. (2161.01.25e)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G03

HOURS: 1.00

TITLE: Digital Read Out (DRO)

1. New American Machinist Handbook

MACHINIST HANBOOK

2. Equipment Operator's Manual

OPERATOR'S MANUAL

3. Ground Equipment Record Procedures

TM 4700-15/1

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

EXAM ID: 21610G04

HOURS: 2.00

TITLE: Job Knowledge Test and Review 21610G01 Through 21610G03

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.10	4:1
X(W)	1.90	4:1

MEDIA: AIO, HO

TERMINAL LEARNING OBJECTIVE(S):

1. Given an hydraulic press, material or equipment requiring pressing in or out, automated systems with internet access, and the current authorized technical information, operate a hydraulic press, to ensure that the pressing operations are completed safety and project is completed according to design, specifications, and the references. (2161.01.10)
2. Given hardness tester, specifications, material to be tested, automated systems with internet access, and the current authorized technical information, operate hardness tester, to ensure the material is tested as specified per the references. (2161.01.20)
3. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, operate a digital read out (dro), to ensure that operations are performed to required specifications per the references. (2161.01.25)

REFERENCE

REFERENCE #

- |                                       |                   |
|---------------------------------------|-------------------|
| 1. New American Machinist Handbook    | MACHINIST HANBOOK |
| 2. Equipment Operator's Manual        | OPERATOR'S MANUAL |
| 3. Fundamentals of Machine Tools      | TC 9-524          |
| 4. Ground Equipment Record Procedures | TM 4700-15/1      |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G05

HOURS: 6.00

TITLE: Operate a Bandsaw

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	1.00	4:1
PA	5.00	4:1

MEDIA: AIO, HO, TV, VCR, VT

TERMINAL LEARNING OBJECTIVE(S):

1. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, operate a bandsaw, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01)
2. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, weld bandsaw blade, to ensure that blade is welded to specifications per the references. (2161.03.05)

ENABLING LEARNING OBJECTIVE(S):

1. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, identify the components of the bandsaw, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01a)
2. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, lay out work, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01b)
3. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, perform preventive maintenance check on bandsaw, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01c)
4. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, cut blade to appropriate length, to ensure that blade is welded to specifications per the references. (2161.03.05a)
5. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, grind ends to match, to ensure that blade is welded to specifications per the references. (2161.03.05b)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G05

HOURS: 6.00

TITLE: Operate a Bandsaw

6. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, weld and anneal blades, to ensure that blade is welded to specifications per the references. (2161.03.05c)
7. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, grind off excess weld, to ensure that blade is welded to specifications per the references. (2161.03.05d)
8. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, check on blade thickness gage, to ensure that blade is welded to specifications per the references. (2161.03.05e)
9. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, fit on bandsaw, to ensure that blade is welded to specifications per the references. (2161.03.05f)
10. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, set up band saw for operation, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01d)
11. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, straight line saw a workpiece, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01e)
12. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, internal saw a workpiece, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01f)
13. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, external saw a workpiece, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01g)
14. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, bandfile a workpiece, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G05

HOURS: 6.00

TITLE: Operate a Bandsaw

the Machinist's Handbook, and references. (2161.01.01h)

15. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, band polish a workpiece, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01i)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

- |  |                   |
|--|-------------------|
| 1. Applicable Equipment Technical Publications | APPLICABLE TM     |
| 2. New American Machinist Handbook             | MACHINIST HANBOOK |
| 3. Equipment Operator's Manual                 | OPERATOR'S MANUAL |
| 4. Naval Aviation Maintenance Program          | OPNAV 4790.2      |
| 5. Equipment Owner's Manual                    | OWNER'S MANUAL    |
| 6. Ground Equipment Record Procedures          | TM 4700-15/1      |
| 7. OPERATOR'S MANUAL, SAW, BAND, CUTTING       | TM 9-3419-227-10  |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G06

HOURS: 1.00

TITLE: Horizontal Band Saw

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	1.00	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given machinist's toolbox, stock, safety equipment, lay out die, shop drawing, measuring tools, automated systems with internet access, and the current authorized technical information, operate a horizontal band saw (cutoff saw), to ensure that cutoff operations are completed accurately and safety per the references. (2161.01.03)

ENABLING LEARNING OBJECTIVE(S):

1. Given machinist's toolbox, stock, safety equipment, lay out die, shop drawing, measuring tools, automated systems with internet access, and the current authorized technical information, lay out work, perform cut off operations after setting saw up for proper blade, feed, and speed for materials to be cut per the reference(s). (2161.01.03a)
2. Given machinist's toolbox, stock, safety equipment, lay out die, shop drawing, measuring tools, automated systems with internet access, and the current authorized technical information, perform preventive maintenance check on saw, to ensure that cutoff operations are completed accurately and safety per the references. (2161.01.03b)
3. Given machinist's toolbox, stock, safety equipment, lay out die, shop drawing, measuring tools, automated systems with internet access, and the current authorized technical information, set up saw for specific cut, to ensure that cutoff operations are completed accurately and safety per the references. (2161.01.03c)
4. Given machinist's toolbox, stock, safety equipment, lay out die, shop drawing, measuring tools, automated systems with internet access, and the current authorized technical information, perform the cutting operation, to ensure that cutoff operations are completed accurately and safety per the references. (2161.01.03d)

NOTE(S):

The use of ferrous and non-ferrous metals will be utilized during initial training.

REFERENCE

REFERENCE #

1. Applicable Equipment Technical Publications
2. New American Machinist Handbook

APPLICABLE TM  
MACHINIST HANBOOK

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G06

HOURS: 1.00

TITLE: Horizontal Band Saw

- |                                       |                |
|---------------------------------------|----------------|
| 3. Naval Aviation Maintenance Program | OPNAV 4790.2   |
| 4. Equipment Owner's Manual           | OWNER'S MANUAL |
| 5. Fundamentals of Machine Tools      | TC 9-524       |
| 6. Ground Equipment Record Procedures | TM 4700-15/1   |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

EXAM ID: 21610G08

HOURS: 3.25

TITLE: Job Performance Test and Review 21610G05 Through 2161G06

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.10	4:1
X(P)	3.15	4:1

MEDIA: AIO, HO, TV, VCR, VT

TERMINAL LEARNING OBJECTIVE(S):

1. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, operate a bandsaw, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01)
2. Given machinist's toolbox, stock, safety equipment, lay out die, shop drawing, measuring tools, automated systems with internet access, and the current authorized technical information, operate a harizontal band saw (cutoff saw), to ensure that cutoff operations are completed accurately and safety per the references. (2161.01.03)
3. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet access, and the current authorized technical information, weld bandsaw blade, to ensure that blade is welded to specifications per the references. (2161.03.05)

REFERENCE

REFERENCE #

- |  |                   |
|--|-------------------|
| 1. Applicable Equipment Technical Publications | APPLICABLE TM     |
| 2. New American Machinist Handbook             | MACHINIST HANBOOK |
| 3. Naval Aviation Maintenance Program          | OPNAV 4790.2      |
| 4. Equipment Owner's Manual                    | OWNER'S MANUAL    |
| 5. Fundamentals of Machine Tools               | TC 9-524          |
| 6. Ground Equipment Record Procedures          | TM 4700-15/1      |
| 7. OPERATOR'S MANUAL, SAW, BAND, CUTTING       | TM 9-3419-227-10  |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

EXAM ID: 21610G09

HOURS: 38.75

TITLE: End of Course Review

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.30	4:1
X(P)	38.45	4:1

MEDIA: AIO, HO, TV, VCR, VT, WBK

TERMINAL LEARNING OBJECTIVE(S):

1. Given a machinist tool box, a lay out die, a piece of raw stock, special measuring tools, a shop drawing, safety equipment, automated systems with internet access, and the current authorized technical information, operate a bandsaw, to ensure that the bandsaw is set up for filing, cutting, polishing, and contour cutting, per the Machinist's Handbook, and references. (2161.01.01)
2. Given machinist's tool box, material required for grinding, shop drawing, coolant, safety equipment, automated systems with internet access, and the current authorized technical information, operate a bench grinder, to ensure that the bench grinder will be operated safely per the references. (2161.01.02)
3. Given machinist's toolbox, stock, safety equipment, lay out die, shop drawing, measuring tools, automated systems with internet access, and the current authorized technical information, operate a horizontal band saw (cutoff saw), to ensure that cutoff operations are completed accurately and safety per the references. (2161.01.03)
4. Given drill press, machinist's toolbox lay out equipment, stock, safety equipment, shop drawing, appropriate bits, measuring tools, automated systems with internet access, and the current authorized technical information, operate a drill press, to ensure that the drill press will be operated safely and per the specifications and references. (2161.01.05)
5. Given an hydraulic press, material or equipment requiring pressing in or out, automated systems with internet access, and the current authorized technical information, operate a hydraulic press, to ensure that the pressing operations are completed safety and project is completed according to design, specifications, and the references. (2161.01.10)
6. Given specific task, lathe, accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, set up the lathe, to ensure that the lathe is operational and the correct method of holding material in the lathe is determined using available accessories per the references. (2161.01.12)
7. Given a lathe with attachments, requirement to cut internal and external threads, measuring equipment, material to thread, alternate holding device, machinist's toolbox, automated systems with internet access, and the current authorized technical information, perform threading operations, to ensure the device cuts internal or external threads to include V sharp, acme and square cuts on material to required specifications using thread per inch or revolutions per inch method. (2161.01.13)

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

EXAM ID: 21610G09

HOURS: 38.75

TITLE: End of Course Review

8. Given lathe with attachments, drill bits, reamers, material requiring one or more of these operations, machinist's tool box, specifications, automated systems with internet access, and the current authorized technical information, perform lathe operations, to ensure drilling, boring, and reaming operations on material using the lathe with attachments to required specifications per the references. (2161.01.14)
9. Given lathe with attachments, measuring equipment, machinist's tool box, material requiring turning, automated systems with internet access, and the current authorized technical information, perform lathe turning operations, to ensure lathe turning operations to include straight taper, facing, grooving, radii, parting, filing and polishing, using the lathe with attachments are required specifications, per the references. (2161.01.15)
10. Given milling machine with attachments and accessories, machinist's tool box, automated systems with internet access, and the current authorized technical information, operate milling machine, to ensure that milling operations are performed to required specifications per the references. (2161.01.17)
11. Given hardness tester, specifications, material to be tested, automated systems with internet access, and the current authorized technical information, operate hardness tester, to ensure the material is tested as specified per the references. (2161.01.20)
12. Given lathe milling attachment/versa mill, material to be milled, cutters, lathe with accessories, machinist's tool box, measuring instruments, specifications, automated systems with internet access, and the current authorized technical information, operate lathe milling attachment/versa mill, to ensure that milling operations are accurate, performed per specifications, and the references. (2161.01.23)
13. Given a machine with x, y, and z digital read out, automated systems with internet access, the current authorized technical information, and machinist tool box, operate a digital read out (dro), to ensure that operations are performed to required specifications per the references. (2161.01.25)
14. Given broken bolt, tap, drill bit or stud, drill, easy outs, stud extractor, electro-disintegrating machine, oxyacetylene welding torch, machinist's tool box, automated systems with internet access, and the current authorized technical information, extract broken bolt, tap, drill bit, or stud, to ensure broken machine part is extracted correctly per the references. (2161.03.01)
15. Given equipment with damaged threads, insert kit, machinist's tool box, safety equipment, automated systems with internet access, and the current authorized technical information, extract thread inserts, to ensure inserts are properly inserted, extracted and replaced. (2161.03.02)
16. Given specifications of items to be drawn, drafting equipment, automated systems with internet access, and the current authorized technical information, prepare shop drawing, to ensure drawing is prepared to specification per the references. (2161.03.04)
17. Given bandsaw with welder, spool or bandsaw blade, automated systems with internet

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ANNEX G - MARINE CORPS UNIQUE

EXAM ID: 21610G09

HOURS: 38.75

TITLE: End of Course Review

access, and the current authorized technical information, weld bandsaw blade, to ensure that blade is welded to specifications per the references. (2161.03.05)

18. Given bench grinder, coolant, tool bit, safety equipment, and automated systems with internet access, and the current authorized technical information, sharpen turning tool bits, to ensure bits are sharpened to required shape per the specifications and references. (2161.03.08)
19. Given bench grinder, tool bit, drill gage, safety equipment, automated systems with internet access, and the current authorized technical information, resharpen twist drill bits, to ensure bits are resharpened to specification and references. (2161.03.09)
20. Given common tools, power tools, precision measuring tools, automated systems with internet access, and the current authorized technical information, follow basic shop procedures, to maintain assigned work area in the accomplishment of maintenance assignments per the references. (2161.04.04)
21. Given equipment repair records, forms and the references, follow basic maintenance procedures, to validate equipment serviceability and completion of maintenance inspections and procedures per the references. (2161.04.05)

REFERENCE

REFERENCE #

- |   |                   |
|---|-------------------|
| 1. Occupational Safety and Health Standards, Hazard Communication | 29 CFR 1910.1200  |
| 2. Applicable Equipment Modification Instruction                  | APPLICABLE MI     |
| 3. Applicable Equipment Technical Publications                    | APPLICABLE TM     |
| 4. DOD Hazard Communication Program                               | DOD INST 6050.5_  |
| 5. GENERAL DRAFTING   | FM 5-553          |
| 6. Local Policies/Procedures                                      | LOCAL POLICIES    |
| 7. New American Machinist Handbook                                | MACHINIST HANBOOK |
| 8. USMC Directives System   | MCO P5215.1       |
| 9. Catalog of Publications  | NAVMC 2761        |
| 10. Naval Aviation Maintenance Program                            | OPNAV 4790.2      |
| 11. Equipment Owner's Manual                                      | OWNER'S MANUAL    |
| 12. Fundamentals of Machine Tools                                 | TC 9-524          |
| 13. Calibration Requirements USMC TMDE CAMP                       | TI 4733-15/1      |
| 14. Use and Care of Hand Measuring Tools                          | TM 10209-10/1     |

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ANNEX G - MARINE CORPS UNIQUE

EXAM ID: 21610G09

HOURS: 38.75

TITLE: End of Course Review

15. Ground Equipment Record Procedures

TM 4700-15/1

16. Care and Use of Hand Tools

TM 9-243

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G10

HOURS: 0.50

TITLE: Introduction to the Machinist Van

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.50	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, operate machinist's van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24)

ENABLING LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, identify the components and characteristics, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24a)

REFERENCE

REFERENCE #

- |  |                    |
|--|--------------------|
| 1. Applicable Stock List SL-3  | APPLICABLE SL-3    |
| 2. Equipment Owner's Manual  | OWNER'S MANUAL     |
| 3. Shop Equipment Semi-Trailer Mounted                                       | SC 4940-95-CL-B02  |
| 4. Ground Equipment Record Procedures  | TM 4700-15/1       |
| 5. Shop Equipment, General Purpose Repair Semi-Trailer Mounted Model SEGPRSM | TM 9-4940-559-14&P |

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SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G11

HOURS: 5.00

TITLE: Setup and Close Machinist Van

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	4.00	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, operate machinist's van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24)

ENABLING LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, select a site for van set up, to ensure the machinist's van is ready to perform required machinist operations per the references.. (2161.01.24b)
2. Given machine shop van, automated system with internet access and current authorized technical information, set up machinist van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24c)
3. Given machine shop van, automated system with internet access and current authorized technical information, close machinist van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24d)

REFERENCE

REFERENCE #

- |  |                    |
|--|--------------------|
| 1. Equipment Owner's Manual  | OWNER'S MANUAL     |
| 2. Ground Equipment Record Procedures  | TM 4700-15/1       |
| 3. Shop Equipment, General Purpose Repair Semi-Trailer Mounted Model SEGPRSM | TM 9-4940-559-14&P |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G12

HOURS: 8.50

TITLE: Inventory the Machinist Van

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.50	4:1
PA	8.00	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, operate machinist's van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24)

ENABLING LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, identify the components of the machinist van inventory, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24e)
2. Given machine shop van, automated system with internet access and current authorized technical information, inventory the machinist van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24f)

REFERENCE

REFERENCE #

- |  |                    |
|--|--------------------|
| 1. Equipment Owner's Manual  | OWNER'S MANUAL     |
| 2. Shop Equipment Semi-Trailer Mounted                                       | SC 4940-95-CL-B02  |
| 3. Ground Equipment Record Procedures  | TM 4700-15/1       |
| 4. Shop Equipment, General Purpose Repair Semi-Trailer Mounted Model SEGPRSM | TM 9-4940-559-14&P |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G13

HOURS: 3.25

TITLE: Perform PMCS on the Machinist Van

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
L	0.50	4:1
PA	2.75	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, operate machinist's van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24)

ENABLING LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, LTI the machinist van equipment and tools, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24g)

REFERENCE

REFERENCE #

- |  |                    |
|--|--------------------|
| 1. Applicable Stock List SL-3  | APPLICABLE SL-3    |
| 2. New American Machinist Handbook   | MACHINIST HANBOOK  |
| 3. Equipment Owner's Manual  | OWNER'S MANUAL     |
| 4. Shop Equipment Semi-Trailer Mounted                                       | SC 4940-95-CL-B02  |
| 5. Ground Equipment Record Procedures  | TM 4700-15/1       |
| 6. Shop Equipment, General Purpose Repair Semi-Trailer Mounted Model SEGPRSM | TM 9-4940-559-14&P |
| 7. FMF SASSY Using Unit Procedures   | UM 4400-124        |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G14

HOURS: 7.00

TITLE: Operation of the Machinist Van Equipment

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	6.00	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, operate machinist's van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24)

ENABLING LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, set up grinder, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24h)
2. Given machine shop van, automated system with internet access and current authorized technical information, set up lathe, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24i)
3. Given machine shop van, automated system with internet access and current authorized technical information, set up versa mill, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24j)
4. Given machine shop van, automated system with internet access and current authorized technical information, set up drill press, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24k)
5. Given machine shop van, automated system with internet access and current authorized technical information, set up hydraulic press, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24l)

NOTE(S):

Each student will work on one piece of equipment for the required time and then they will rotate to the next piece of equipment. This will allow each Marine to work on the van and become familiar its operation.

The students will have the following times on each piece of equipment.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G14

HOURS: 7.00

TITLE: Operation of the Machinist Van Equipment

Grinder	1.5 Hours
Lathe	.75
Versa mill	.75
Drill press	1.5
Hydraulic press	1.5

REFERENCE

REFERENCE #

- |   |                    |
|---|--------------------|
| 1. Equipment Owner's Manual   | OWNER'S MANUAL     |
| 2. Shop Equipment Semi-Trailer Mounted  | SC 4940-95-CL-B02  |
| 3. Fundamentals of Machine Tools  | TC 9-524           |
| 4. Ground Equipment Record Procedures   | TM 4700-15/1       |
| 5. Shop Equipment, General Purpose Repair Semi-Trailer Mounted<br>Model SEGPRSM | TM 9-4940-559-14&P |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX G - MARINE CORPS UNIQUE

LESSON ID: 21610G15

HOURS: 3.75

TITLE: Machinist Van Record Jacket

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
D	0.50	4:1
L	0.50	4:1
PA	2.75	4:1

MEDIA: AIO

TERMINAL LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, operate machinist's van, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24)

ENABLING LEARNING OBJECTIVE(S):

1. Given machine shop van, automated system with internet access and current authorized technical information, identify the components of the NAVMC 696 record jacket, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24m)
2. Given machine shop van, automated system with internet access and current authorized technical information, complete the NAVMC 696 record jacket, to ensure the machinist's van is ready to perform required machinist operations per the references. (2161.01.24n)

REFERENCE

REFERENCE #

- |  |                    |
|--|--------------------|
| 1. Applicable Stock List SL-3  | APPLICABLE SL-3    |
| 2. New American Machinist Handbook   | MACHINIST HANBOOK  |
| 3. Equipment Owner's Manual  | OWNER'S MANUAL     |
| 4. Shop Equipment Semi-Trailer Mounted                                       | SC 4940-95-CL-B02  |
| 5. Ground Equipment Record Procedures  | TM 4700-15/1       |
| 6. Shop Equipment, General Purpose Repair Semi-Trailer Mounted Model SEGPRSM | TM 9-4940-559-14&P |
| 7. FMF SASSY Using Unit Procedures   | UM 4400-124        |

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX Z - ADMINISTRATIVE

EVENT ID: 21610Z01

HOURS: 8.00

EVENT: In Processing

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
ADMIN	8.00	4:1

MEDIA:

NOTE(S):

During this time the Marine will fill out all necessary administrative paperwork, receive a financial and medical brief, receive an academic in brief from the academic coordinator, and receive the command welcome aboard brief from the Commanding Officer and the First Sergeant.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX Z - ADMINISTRATIVE

EVENT ID: 21610Z02

HOURS: 8.00

EVENT: Out Processing / Graduation

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
ADMIN	8.00	4:1

MEDIA:

NOTE(S):

The students will receive their orders, check out of medical, dental, supply, and various organizations aboard the post. Upon completion of checking out the Marines will be issued their orders and will have a short graduation ceremony.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX Z - ADMINISTRATIVE

EVENT ID: 21610Z03

HOURS: 13.00

EVENT: Commanders Time

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
CMDR	13.00	4:1

MEDIA:

NOTE(S):

There are 18 sessions where commanders time will be implemented in the schedule for a total of 18 non-academic hours. During this time the Marines will conduct PT and have uniform inspections. The commanders time is only used during the Marine Unique portions of the school, A and G annex.

MACHINIST

SECTION IV - CONCEPT CARDS

ANNEX Z - ADMINISTRATIVE

EVENT ID: 21610Z04

HOURS: 8.00

EVENT: Drivers Improvement

<u>METHOD</u>	<u>HOURS</u>	<u>S:I RATIO</u>
GD	8.00	4:1

MEDIA: TV, VCR, VT

NOTE(S):

In accordance with MCO 5100.19E All military personnel under the age of 26 will complete a course in traffic safety designed to establish and reinforce a positive attitude toward driving. Personnel will attend the Driver Improvement Course (DIC) within the first 90 days after completion of recruit training or officer candidate school.

## MACHINIST PROGRAM OF INSTRUCTION

### SECTION V - STUDENT PERFORMANCE EVALUATION

1. SCOPE. There are two measurement methods used for the Machinist Course. Individual lessons are evaluated by either performance evaluation calling for the student to duplicate the job performance requirements or test items on written examinations given during class.

2. MASTERY LEARNING. The evaluative philosophy utilized in this course stresses student achievement of all learning objectives. Students must master 100% of all Terminal Learning Objectives (TLO's) presented during all periods of instruction. Evaluations are used to determine mastery of the learning objectives, and not rank order the students. The Marines are required to score a minimum of 80% for all exams in Marine unique portions of the school and score a minimum of 70% for all ITRO portions of the school.

3. EVALUATION OF STUDENTS. Each student is evaluated on each annex's learning objectives before proceeding to the next annex. This is accomplished through written test items concerning the subject material and through informal observation of student performance during practical application.

a. Written Evaluations. Knowledge-based learning objectives are evaluated by written examinations given through the course that contain written test items.

b. Practical Application. Students will be informally evaluated and provided feedback by instructors through observation of student performance during practical applications. Instructors evaluate student performance and provide feedback and remedial instruction until mastery of the learning objectives are achieved. The student who does not master a given subject must exert more effort and will be given one additional opportunity to achieve mastery of the learning objectives through remedial instruction. It is the responsibility of the Machinist Course staff to render every assistance to each student needing help to achieve mastery.

c. Performance Evaluation. A performance test covering all performance-based learning objectives is conducted at the end of each annex. Students are evaluated via a performance checklist completed by the instructors.

d. There is an End of Course (EOC) Exam which takes all of the tasks that are taught and put into one final project which allows the student to plan and complete the project without the benefit of a performance checklist.

e. A complete listing of all exams given can be found in section IV.

MACHINIST PROGRAM OF INSTRUCTION

SECTION VI - DISTRIBUTION LIST

DISTRIBUTION

QUANTITY

CG, TECOM (C464)	3
CG, Training Command (C475)	3
COMMARFORLANT	1
COMMARFORPAC	1
COMMARFORRES	1
Marine Corps Institute (MCI)	1