POI 3AZR27370 D

(PDS Code MGW)

PLAN OF INSTRUCTION (Technical Training)

BUIC COMPUTER PROGRAMMING



KEESLER TECHNICAL TRAINING CENTER

8 April 1970

VOLUME 2 of 4 VOLUMES

LIST OF EFFECTIVE PAGES

Total Number of Pages in This Publication is 39 Consisting of the Following:

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DEPARTMENT OF THE AIR FORCE Hq, 3380th Technical School (ATC) Keesler Air Force Base, Mississippi 39534 Volume 2 PLAN OF INSTRUCTION 3AZR27370 D (PDS Code MGW) 8 April 1970

FOREWORD

1. PURPOSE. This volume prescribes the qualitative requirements for Blocks II and III of <u>Course 3AZR27370 D</u>, <u>BUIC Computer Programming</u>, in terms of learning objectives (criterion and enabling) presented in the preferred teaching sequence, and shows their duration, support materials, and guidance. It was developed under the provisions of ATCR 52-7, Plan of Instruction, and ATCR 52-33, Instructional System Development.

2. COURSE DESCRIPTION. This course trains Air Force NCOs in the skills and knowledges needed by them to perform as BUIC III computer programmers. The course includes computer principles, computer mathematics, basic programming concepts and techniques, BUIC assembler language programming, and BUIC compiler language programming. It also includes analysis of the BUIC III System functional areas of air surveillance, information transfer, weapons, simulation, recording, control, and ADP/BCDP interface. On-equipment training includes preparation, assembly, and debugging of assembly and compiler language programs, adaptation data, and geography; use of simulation techniques to create an artificial environment for system testing; operation of ADP program for system testing and recording; reduction and analysis of test results; and use of the utility programs to construct, verify, and maintain the ADP master tapes.

3. COURSE FORM. Pages iii and iv describe instruction in terms of major subject areas and time allocation as shown in table III of the course chart. The six-hour day (360 minutes) includes 300 minutes for instruction in classroom/laboratory activities and 60 minutes for student administrative activities such as breaks, clean-up, and class change.

4. EQUIPMENT ALLOWANCES AND AUTHORIZATIONS. With the exception of the prime training vehicle which is authorized in the PC documents, equipment required to conduct this course is listed in Equipment Authorization Inventory Data Number OZRO124. The following TAs apply:

TA 006 Organizational and Administrative Equipment TA 014 Individual Training TA 636 Film Library

OPR: Computer Systems Department DISTRIBUTION: As directed by ATCR 52-7. 5. REFERENCES. This Plan of Instruction is based on COURSE TRAINING STANDARD 3AZR27370 D, 22 December 1969 and COURSE CHART 3AZR27370 D, 21 February 1970.

FOR THE COMMANDER

ROSS A. BECKHAM, JR., Colonel, USAF Chief, Operations Division

	TABLE III - COURSE CONTENT - COURSE CHART _ 3AZR273	70 D
HOURS	1 2 3 4	5 6
	Course Material - INCLASSIFIED	90 Hours
1	BLOCK I - Programming Principles	
	Orientation (1 hr); Introduction to computer (5 hrs);	Computer
2	mathematics (13 hrs); Boolean logic (5 hrs); Basic pr techniques (6 hrs); Flowchart design and analysis (55 Measurement (5 hrs).	oblem solving hrs);
		. *
3		
	Company Material INION ACCOUNTED	70 11
1.	Course Material - UNCLASSIFIED	78 Hours
4	BLOCK II - Central Processor Programming I	
	Introduction to AN/CCA_51A Suptom (2 hyp), Posic inst	rustion set (20 hrs).
	Incloudceion to AN/GSA-DIA System (3 ATS); Basic inst	inction set (29 hrs);
F	comparison and logical instructions (10 hrs); introdu	tion to compool
2	programming (6 nrs); Shift, complex arithmetic, condi	tional branch, and
	repeat instructions (24 hrs); Measurement (6 hrs).	
6	Course Material - UNCLASSIFIED	66 Hours
	BLOCK III - Central Processor Programming II	
	Field and character search instructions (12 hrs); Min	i-BUIC system (15 hrs)
7	Floating point instructions (9 hrs); Special system o	oriented codes (9 hrs)
•	Subroutines (9 hrs); Interrupt system (6 hrs); Measur	ement (6 hrs).
		•
•		
8	Course Material - UNCLASSIFIED	63 Hours
	BLOCK IV - Input/Output Programming	
		_
	Introduction (1 hr); Input/output communications (14	hrs); Programming
	terminal devices (45 hrs); Measurement (3 hrs).	
9		
		4
	Course Material SECRET 33 hrs	
	Course Material - SECREI 55 mis	
	BLOCK V - BUIC System Analysis I	
	BLOCK V - BUIC System Analysis I	
10	BLOCK V - BUIC System Analysis I Introduction (9 hrs)(S); Air surveillance	
10	BLOCK V - BUIC System Analysis I Introduction (9 hrs)(S); Air surveillance (21 hrs)(S); Measurement (3 hrs)(U).	
10	BLOCK V - BUIC System Analysis I Introduction (9 hrs)(S); Air surveillance (21 hrs)(S); Measurement (3 hrs)(U).	
10	BLOCK V - BUIC System Analysis I Introduction (9 hrs)(S); Air surveillance (21 hrs)(S); Measurement (3 hrs)(U).	
10	BLOCK V - BUIC System Analysis I Introduction (9 hrs)(S); Air surveillance (21 hrs)(S); Measurement (3 hrs)(U). Above titles are unclassified	
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10	BLOCK V - BUIC System Analysis I Introduction (9 hrs)(S); Air surveillance (21 hrs)(S); Measurement (3 hrs)(U). Above titles are unclassified	· · · · · · · · · · · · · · · · · · ·
10	BLOCK V - BUIC System Analysis I Introduction (9 hrs)(S); Air surveillance (21 hrs)(S); Measurement (3 hrs)(U). Above titles are unclassified	

	TABLE III - COURSE CONTENT - COURSE	CHART 3AZR	27370 D		
HOURS	1 2 3	4	5	6	
11	Course Material - SECRET 36 Hours BLOCK VI - BUIC System Analysis II				
12	transfer (11 hrs)(S); Simulation (4 hrs)(U); Measurement (3 hrs)(U).	Course Ma BLOCK VII	terial - UN - Utility	CLASSIFIED Computer	
13	Above titles are unclassified	Introduct UCP (5 hr vice prog maintenan	ion (1 hr); s); UCP con rams (6 hrs ce (6 hrs);	Initializit trol and set); Tape fil Assemblers	s ing er- le s
14		(6 hrs); Utility m Measureme	Adaptation aintenance nt (3 hrs).	(6 hrs); system (3 l	hrs]
15	Course Material - UNCLASSIFIED BLOCK VIII - Program Testing and Anal Introduction (1 hr); Startover, contr Test planning (11 hrs); BUIC exercise Facility system (12 hrs); BUIC analys hrs); Master tape generation (6 hrs);	lysis col, and ADP/ e preparation sis and reduc ; Program err	9 BCDP interf system (BE tion system or correcti	ace (10 hr: PS) (16 hr: (BARS) (1 on (12 hrs)	s); s); 0);
16	Program report processing (6 hrs); Me	easurement (6	hrs).	•	
17	Course Material - UNCLASSIFIED BLOCK IX - Compiler Language Techniqu	ies	4	2 Hours	bre i
18	Measurement (4 hrs); Course critique	and graduati	on (2 hrs).		

PLAN OF INSTRUCTION COURSE TITLE BUIC Computer Programming						
BLOCK TITLE Central Processor Programming I						
LEARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIALS A	ND GUIDANCE		
		Wk4-Dyl				
1. Introduction to AN/GSA-51A System		3	Instructional Materials C175-BUIC-HO, AN/GSA-51A Card C176-BUIC-HO, AN/GSA-51A Programming Code Card C178-BUIC-HO, AN/GSA-51A Sheet C184-BUIC-WB, AN/GSA-51A Programming C185-BUIC-ST, AN/GSA-51A C193-416M-SU, Register Re TO 31Z3-178-18, Programmi TM 2387/102/01, Assembly TM 2780/004/00, General U Manual (I)	Programming Code Input/Output Symbolic Coding Central Processor Programming Manual efference Sheet ing Manual (I) and Analysis (I) tility User's		
			Equipment and Training Ai AN/GSA-51A Computer Syste O26 Card Punch (1) Overhead Projector	<u>ds</u> m (9)		
a. Without references, correctly answ of a set of introductory level questions p	ver at least 70% vertaining to:		Training Methods Ds-Dm 3 hrs Instructional Guidance Outline the major topics each of the three machine	to be covered in blocks. Describe		
PLAN OF INSTRUCTION NO. 3AZR27370 D	DATE 8 April 1	970	BLOCK NO. II -PAG	GENO. 1		

PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES	DU RATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE		
 (1) Basic features, characteristics, and functions of computer modules (2) Basic features, characteristics, and functions of the following primary storage devices: (a) Memory module (b) Thin film (c) Magnetic drums (3) Length and format of computer word (4) Basic function of peripheral equipment (5) Data flow within the AN/GSA-51A (6) Basic function of the switching interlock (7) Basic function of the I/O exchange (8) Advantages and disadvantages of modular organization 	E	the Block II examination. State the purpose of the programming blocks.		
<pre>b. Given appropriate references, answer at least 70% of a set of the questions pertaining to: (CTS para 2d,e) (1) Information contained on the AN/GSA-51A Pro- gramming Code Card in regard to: (a) Instruction names (b) Instruction mnemonics (c) Octal codes of instructions (d) Syllable layouts for instructions (e) Thin film map (f) Special syllables (2) Information contained on the AN/GSA-51A Input/ Output Programming Code Card (3) Instruction terminology</pre>	Е	Give each student a programming card and show them how to use it.		
2. Basic Instruction Set	29	Instructional Materials C175-BUIC-HO, AN/GSA-51A Programming Code Card C176-BUIC-HO, AN/GSA-51A Input/Output		

PLAN OF INSTRUCTION (Continued)				
LEARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE
			Programming Code Card C178-BUIC-HO, AN/GSA-5 Sheet C184-BUIC-WB, AN/GSA-5 Programming C185-BUIC-ST, AN/GSA-5 TO 31Z3-178-18, Progra TM 2387/102/01, Assemb Equipment and Training AN/GSA-51A Computer Sy 026 Card Punch (1) Overhead Projector Training Methods Ds-Dm 14 hrs, P 15 hrs	LA Symbolic Coding LA Central Processor LA Programming Manual mming Manual (I) Ly and Analysis (I) <u>Aids</u> stem (9)
 a. Given appropriate references and protions, write at least one program which inclutions, control codes, declarative codes, sym RC words identified in the following enabling grade of at least 70% is required for satisf ment. (CTS para 2b,d,f,h,i,j,k; 2g(1),(4); 2 (1) Format and function of basic ins (a) BINARY Add (BAD) (b) Binary Subtract (BSU) (c) Clear (CLA) (d) No Operation (NOP) (e) Halt (HLT) 	blem specifica- udes the instruc- bolic tags, and g objectives. A actory achieve- g(5)) tructions:	(3) C	Instructional Guidance Throughout this block will be required to wr exercising a basic gro This group of instruct quite limited, but wil progress through the c to punch and submit al permitting, for comput analyzing and debuggin of their programs. NOTE: Students should one program a day to be production on the comp	of instruction students ite many short programs up of instructions. ions will initially be l increase as students ourse. Encourage them l their programs, time er operation. Assist in g all assembler outputs be assigned at least e coded and punched for uter. Stress that they
PLAN OF INSTRUCTION NO. 3AZR27370 D	DATE 8 April 19	970	BLOCK NO. II	PAGE NO. 3

PREVIOUS EDITIONS OBSOLETE.

L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE
(a) Identity (IDT) (b) End (END)		Е	they wish to code and j them, time and facilit:	punch will be run for ies permitting.
			NOTE: All instructions be coded on AN/GSA-51A in proper format. Give and information for run at a later time.	and programs should symbolic coding sheets students sequence of h cards. Explain them
			Give students several p to binary add and binar numbers. These problems complex until the stude as specified in the cri	problems requiring them ry subtract pairs of s should become more ent is able to perform iterion objective.
		Wk4-Dy2		
		(4)		
 (3) Purpose and structure of data work (a) Decimal (DEC) (b) Octal (OCT) (c) Hollerith (HOL) (d) Ditto (DIT) 	rds:	E		
(4) Rules governing use of symbolic	tags	Е		
(5) Purpose and structure of RC words	5	Е		
		(2)		
b. Given a program, appropriate reference instructor assistance; assemble at least one A grade of at least 70% is required for satis	ces, and minimum program in octal sfactory achieve-		Maximum instructor assi initially. This require students gain knowledge	istance will be required ement will ease as and experience;
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATER	IALS AND GUIDANCE
ment. (CTS para 2d,f,h,j; 2g(1),(4))		C	however, all student ; should be checked by detailed and time con	programs assembled an instructor. This is suming work.
(1) Identify various types of syllab AN/GSA-51A Programming Code Cards	les on the	E	Give students a proble will cause them to use tions covered to date submitted for a run du laboratory period (Wk	em for homework that e most of the instruc- . This program must be uring the second student 4-Dy5).
(2) Write octal assembler outputs	:	Е		
		Wk4-Dy3		
		(2)		
(3) Identify the advantage of syllab	le packing	E		
(4) Identify the effect of an asteri packing	sk on syllable	Е		
		(2)		
c. Given a list of assembler terms and a of a program, identify and interpret the iter required. A grade of at least 70% is required achievement. (CTS para 2b,c,f,h,i,j; 2g(1),(an assembler dump ns in the dump as 1 for satisfactory 4))	C		
(1) Identify terms with definitions		Е		
(2) Identify steps required to assemble a program	ole and operate	E		
PLAN OF INSTRUCTION NO. 3AZR27370 D	DATE 8 April]	1970	BLOCK NO. II	PAGE NO. 5

PLAN OF INSTRUCTION (Continued)			
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE
(3) Select control cards in the sequence required for specified assembler functions	Е		
(4) Interpret a core dump	Е		
	(2)		
d. Given a set of specifications and appropriate references, correctly write at least one program in assembler language which will include instructions identified in the following enabling objectives. (CTS para 2c,d,h; 2g(1),(3), (4))	с		
(1) Identify advantages of thin film memory over other means of storage	E		
(2) Identify thin film registers by name, location, and function	Е		
(3) Function of the Program Counter Register (PCR) and Program Storage Register (PSR) during instruction execu- tion	Е		
	Wk4-Dy4		
	(5)		
(4) Operation of the Operand Stack	E		
 (5) Format and function of instructions used to operate the operand stack: (a) Step Stack Down (SSD) (b) Step Stack Up (SSU) (c) Reverse Stack (RVS) 	E	Give a practice problem that will utilize the tions covered thus far	m from the workbook thin film and instruc- •
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PLAN OF IN	STRUCTION (Continued)		
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MA	TERIALS AND GUIDANCE
 (6) Format and function of instructions used access thin film memory: (a) Load Thin Film (LTF) (b) Store Thin Film (STF) (c) Multiple LTF/STF 	to E		
(7) Function of the Real Time Clock (RTC)	E		×.
(8) Write a set of instructions that can be incorporated into a program to time the operation of program	the E		
e. Given a set of specifications and appropriate references, correctly write at least one program in a language which will include instructions identified i following enabling objectives. A grade of at least 70 required for satisfactory achievement. (CTS para 2c,d $2g(1),(3),(4)$)	ssembler n the % is ,h; C		
(1) Format and function of Transmit (TRS) and Transmit Modified (TRM) instructions	Е		
	Wk4-Dy5		
	(2)		
(2) Format and function of the Unconditional Transfer (UCT) instruction	E		
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE
(3) Write and debug assigned program	5	E	Programming Laboratory Observe the run of the Wk4-Dy3 and debug it it students in debugging t and rerun the programs out thin film dump and assembler output. Durin periods in the block, a flow, code, punch, and operation the programs the requirements of the After each assembly or student will analyze th errors, and resubmit th required specifications ed with the programs as laboratory period, the ed to work toward compl assigned projects. Prog	program written on f necessary. Assist their programs. Correct if time allows. Point special registers on ng all laboratory students will interpret, submit for assembly or assigned to satisfy criterion objectives. operation attempt, the he results, correct any he program until a are met. When finish- signed for the present student will be expect- leting previously grams will normally be ratory periods so that
			time to flow and code t	cheir programs.
		(2)		
f. Given a set of specifications and appreferences, correctly write at least one flow assembler language. Use both relative and ind A grade of at least 70% is required for satisment. (CTS para 2d,f,h,i,j; 2g(1),(3),(4)) (1) Theory and purpose of relative ad the use of Base Address Register (BAR) and th Register (BPR) in relative addressing	propriate atable program in lirect addressing. sfactory achieve- ddressing and he Base Program	C		
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE		
(2) Given a short routine, add the instructions required to make the routine floatable	E			
(3) Format and use of indirect addressing	E			
	(2)			
g. Given a set of specifications and appropriate references, correctly write at least one program in both assembler language and octal dump form to accomplish looping and syllable modification. A grade of at least 70% is required for satisfactory achievement. (CTS para 2b,d,f,h,i, j,k; $2g(1),(3),(4)$)	C			
 (1) Function of Index Registers: (a) Looping (b) Syllable modification 	E			
(2) Function of Limit Registers	E			
	Wk5-Dyl			
	(1)			
(3) Purpose of <u>Index</u> , <u>Limit - Compare</u> Instruction (XLC)	E			
	(1)			
(4) Write and debug assigned programs	E	Programming Laboratory Use this time for writing, analyzing and debugging programs as required by the criterion objective.		
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PREVIOUS EDITIONS OBSOLETE.

PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE		
3. Comparison and Logical Instructions. Given a set of specifications and appropriate references, correctly write at least one program in assembler language and in octal form which will include the compare and logical instructions identified in the following enabling objectives. A grade of at least 70% is required for satisfactory achievement. (CTS para 2d,f,h,j; 2g(1),(3),(4)) a. Format and use of compare instructions: (1) Alphanumeric Compare Equal (ACE) (2) Alphanumeric Compare Greater (ACG) (3) Alphanumeric Compare Less (ACL) (4) Compare Equal (CEQ) (5) Compare Greater (CGR) (6) Compare Less (CLS) 	10 C (4) E	Instructional Materials Cl75-BUIC-HO, AN/GSA-51A Programming Code Card Cl76-BUIC-HO, AN/GSA-51A Input/Output Programming Code Card Cl78-BUIC-HO, AN/GSA-51A Symbolic Coding Sheet Cl84-BUIC-WB, AN/GSA-51A Central Processor Programming Cl85-BUIC-ST, AN/GSA-51A Programming Manual Cl93-416M-SU, Register Reference Sheet TM 2387/102/01, Assembly and Analysis (I) TM 2780/004/00, General Utility User's Manual (I) TO 31Z3-178-18, Programming Manual (I)		
 b. Format and use of logical instructions: (1) Logical AND (LAN) (2) Logical OR (LOR) (3) Logical Exclusive OR (LXR) (4) Logical Complement (LCM) c. Write and debug assigned programs	Wk5-Dy2 (3) E (3)	Equipment and Training Aids AN/GSA-51A Computer System (9) 026 Card Punch (2) Flowcharting Template (1) <u>Training Methods</u> Ds-Dm 5 hrs, P 5 hrs(2) <u>Programming Laboratory</u> Use this time for writing, analyzing and debugging programs as required by the criterion objective.		
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PLAN OF INSTRUCTION (Continued)					
L EARNING OBJECTIVES DURATION (HOURS)		SUPPORT MATERIALS AND GUIDANCE			
 4. Introduction to Compool Programming. Given a set of specifications and appropriate references, correctly write at least one program in assembler language which will use compool sensitive data. A grade of at least 70% is required for satisfactory achievement. (CTS para 2b,c,d,f,h,j,k; 2g(1),(3),(4)) a. Structure and purpose of COMPOOL and LAYOUT b. Format of compool sensitive data words: (1) Mask (MSK) (2) Complement Mask (CMK) 	2 Wk5-Dy3 6 (3) C E	<u>Instructional Materials</u> <u>Cl78-BUIC-HO, AN/GSA-51A Symbolic Coding</u> Sheet Cl84-BUIC-WB, AN/GSA-51A Central Processor Programming Cl85-BUIC-ST, AN/GSA-51A Programming Manual TM 2385/203/00, COMDOC TM 2385/204/00, COMPOOL and LAYOUT TM 2780/004/00, General Utility User's Manual (I) TM 2387/102/01, Assembler and Analysis (I)			
(3) Value (VAL)	E	Equipment and Training Aids Overhead Projector AN/GSA-51A Computer System (9) 026 Card Punch (2) Flowcharting Template (1) Training Methods Ds-Dm 3 hrs P 3 hrs(2)			
c. Write and debug assigned programs	E (3)	Programming Laboratory Use this time for writing, analyzing and debugging programs as required by the criterion objective.			
Instructions	24	Cl75-BUIC-HO, AN/GSA-51A Programming Code Card Cl76-BUIC-HO, AN/GSA-51A Input/Output Pro-			
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PLAN OF INSTRUCTION (Continued)					
L EARNING OBJECTIVES		DURATION (HOURS) 2	TION JRS) SUPPORT MATERIALS AND GUIDANCE 3		
			gramming Code Card C185-BUIC-ST, AN/GSA-5: C193-416M-SU, Register TM 2387/102/01, Assemb: TM 2780/004/00, General Manual (I) TO 31Z3-178-18, Program Equipment and Training Overhead Projector AN/GSA-51A Computer Sys 026 Card Punch (2) Flowcharting Template	LA Programming Manual Reference Sheet Ly and Analysis (I) I Utility User's mming Manual (I) <u>Aids</u> stem (9)	
			Training Methods Ds-Dm 10.5 hrs, P 13.5	hrs(2)	
		Wk5-Dy4			
		(6)			
a. Given a set of specifications and appreference material, correctly write at least assembler language which will correctly util: instructions. A grade of at least 70% is require satisfactory achievement. (CTS par 2d,f,h,j,h $2g(2)$)	propriate one program in ize shift uired for x; 2g(1),(3),(4);	С			
 (1) Format and function of single shift cycle instructions: (a) Arithmetic Left Cycle (ALC) (b) Arithmetic Right Cycle (ARC) (c) Arithmetic Left Shift (ALS) (d) Arithmetic Right Shift (ARS) 	ift and single				
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PLAN OF INSTRUCTION (Continued)					
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE			
<pre>(e) Full Left Cycle (FLC) (f) Full Right Cycle (FRC) (g) Full Left Shift (FLS) (h) Full Right Shift (FRS)</pre>	Е				
(2) Code single class instructions to shift or cycle the contents of a memory location a specified number of bits	Е				
 (3) Format and function of dual shift and dual cycle instruction: (a) Arithmetic Left Cycle Double (ALCD) (b) Arithmetic Right Cycle Double (ARCD) (c) Arithmetic Left Shift Double (ALSD) (d) Arithmetic Right Shift Double (ARSD) (e) Full Left Cycle Double (FLCD) (f) Full Right Cycle Double (FRCD) (g) Full Left Shift Double (FRSD) (h) Full Right Shift Double (FRSD) (4) Code dual class instruction to shift or cycle the contents of a memory location a specified number of bits 	E				
(5) Function of compool sensitive shift instructions (CYC)	E				
(6) Code compool sensitive shift instructions	Е				
(7) Write and debug assigned programs	E	Programming Laboratory Use this time for writing, analyzing and debugging programs as required by the criterion objective.			
	Wk5-Dy5				
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PREVIOUS EDITIONS OBSOLETE.

PLAN OF INSTRUCTION (Continued)						
L EARNING OBJECTIVES	DU RATION (HOURS) 2	LS AND GUIDANCE				
	(6)					
b. Given a set of specifications and appropriate references, correctly write at least one program in assembler language which will use the complex arithmetic instructions. A grade of at least 70% is required for satisfactory achieve ment. (CTS para 2d,f,h,j,k; 2g(1),(3),(4))	c					
<pre>(1) Function and format of complex arithmetic instructions:</pre>	E					
(2) Perform fixed point scaling operations	E					
	Wk6-Dyl					
	(2)					
(3) Perform an arithmetic calculation on compool defined, fixed point items	E					
	(2)					
(4) Write and debug assigned programs		Programming Laboratory Use this time for write debugging programs as a criterion objective.	ing, analyzing and required by the			
	(2)					
c. Given a set of specification and appropriate refer- ences, correctly write at least one program in assembler language which will use the Conditional Branch (BRB) and						
PLAN OF INSTRUCTION NO. 3AZR27370 D DATE 8 April 197	0	BLOCK NO. II	PAGE NO. 14			

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PLAN OF INSTRUCTION (Continued)						
L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE			
Repeat (RPT) instructions. A grade of at least for satisfactory achievement. (CTS para 2d,f,h (3),(4))	70% is required h,j,k; 2g(1),	c				
(1) Format and function of the Conditi (BRB) instruction	Ional Branch	E				
		Wk6-Dy2				
		(3)				
(2) Format and function of Repeat (RPI	f) instruction	Е				
		(3)				
(3) Write and debug assigned programs		E	Programming Laboratory Use this time for writing, analyzing and debugging programs as required by the criterion objective.			
		Wk6-Dy3				
6. Measurement		6	Instructional Materials Cl75-BUIC-HO, AN/GSA-51A Programming Code Card Cl76-BUIC-HO, AN/GSA-51A Input/Output Programming Code Card Cl78-BUIC-HO, AN/GSA-51A Symbolic Coding Sheet Cl85-BUIC-ST, AN/GSA-51A Programming Manual Cl93-416M-SU, Register Reference Sheet TM 2780/004/00, General Utility User's Manual (I) ATCR 52-3, Measurement (I)			
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PREVIOUS EDITIONS OBSOLETE.

PLAN OF INSTRUCTION (Continued)					
		DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE		
			ATCR 52-29, Student Critique Program (I) Equipment and Training Aids Flowcharting Template (1) Training Methods TP 5 hrs, Ds 1 hr		
a. Examination		(5)	Administer the examination in accordance with current policies, procedures and regulations.		
b. Critique			Critique the examination in accordance with applicable policies and procedures.		
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PLAN OF INSTRUCTION	COURSE TITLE BUIC Computer Programming				
BLOCK TITLE Central Processor Programming	II				
LEARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERI	ALS AND GUIDANCE	
		Wk6-Dy4			
1. Field and Character Search Instruction	as (Part I)	9	Instructional Material Cl75-BUIC-HO, AN/GSA-5 Card Cl76-BUIC-HO, AN/GSA-5 Programming Code Card Cl78-BUIC-HO, AN/GSA-5 Sheet Cl81-BUIC-WB, Mini-BUI Cl84-BUIC-WB, Mini-BUI Cl84-BUIC-WB, AN/GSA-5 Programming Cl85-BUIC-ST, AN/GSA-5 Cl93-416M-SU, Register TM 2780/004, General U (I) TM 2387/102/01, Assemb TO 31Z3-178-18, Progra Equipment and Training Overhead Projector AN/GSA-51A Computer Sy 026 Card Punch (2) Flowcharting Template Training Methods Ds-Dm 7 hrs, P 2 hrs(2)	Ls 51A Programming Code 51A Input/Output 1 51A Symbolic Coding IC System 51A Central Processor 51A Programming Manual r Reference Sheet Jtility User's Manual oly and Analysis (I) amming Manual (I) 3 Aids rstem (9) (1)	
PLAN OF INSTRUCTION NO. 3AZR27370 D	DATE 8 April 19	1 70 [°]	BLOCK NO. III	PAGE NO: 17	
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PLAN OF INSTRUCTION (Continued)						
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE			
		Instructional Guidance				
	(클)					
a. Overview of the Block		Describe the overall p outline its subject ma Explain the purpose of Vehicle) program and c with those of ADP (Air Point out that during will write, assemble, RP* program from the B the specifications for this time.	urpose of Block III and tter organization. the BTV (BUIC Training ompare its functions Defense Program). Block III, each student debug, and operate the TV program. Hand out this BTV program at			
		Advise students that d jects an effort will be instructors at the com one to operate the com assist in analyzing and programs after each run problems will be encour programs, time permitt specifications are ach tor will be present in sist students having main including those require their program.	uring laboratory pro- e made to have two puter at all times - puter and the other to d debugging student n. Students with minor raged to resubmit their ing, until correct ieved. A third instruc- the classroom to as- ajor difficulties, ing a major rewrite of			
	(5步)					
b. Given a set of specifications and appropriate references, write at least one program in assembler langua which will correctly utilize the field instructions identi-	ge					
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PLAN OF INSTRUCTION (Continued)						
L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE		NCE	
fied in the following enabling objectives. A least 70% is required for satisfactory achie 2b,c,f,h,j,k; 2g(1))	A grade of at evement. (CTS para	С				
<pre>(1) Function and use of field instru (a) Group 1: <u>1</u> Binary Add Field (BAF) <u>2</u> Binary Subtract Field (BS <u>3</u> Logical OR Field (LOF) <u>4</u> Logical AND Field (LAF) <u>5</u> Logical Complement Field <u>6</u> Logical Exclusive OR Fiel (b) Group 2: <u>1</u> Compare Equal Field (CEF) <u>2</u> Compare Greater Field (CI (c) Group 3: Strip and Adjust Fi (d) Group 4: Adjust and Insert F</pre>	actions: (LCF) d (LXF) F) Leld (SAF) Tield (AIF)	E				
(2) Structure and use of field sylla	ble	E	л.,			•
(3) Code field instructions		Е	.			
(4) Function and use of the operand junction with the field instructions	stack in con-	Е				
(5) Calculate and analyze assembler field instructions	output for given	Е				
		Wk6-Dy5				
		(3)				
(6) Using a given compool, code comp field instructions	ool sensitive	E				
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PLAN OF INSTRUCTIO	N (Continued)			
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE	
(7) Write and debug assigned programs	E	Programming Laboratory During this period stu debug programs to sati the criterion objectiv	dents will prepare and sfy the requirements of e.	
2. Mini-BUIC System (Part I). Given appropriate references and the specifications for a radar processing program, prepare a program to meet the specifications. A grade of at least 70% is required for satisfactory achievement. (CTS para 2b,c,d,e,h,i,j,k;2f; 2g(1); 2g(3),(4)) a. List the steps require to assemble and operate the	3 C	Instructional Material Cl75-BUIC-HO, AN/GSA-5 Card Cl76-BUIC-HO, AN/GSA-5 Programming Code Card Cl78-BUIC-HO, AN/GSA-5 Sheet	s IA Programming Code LA Input/Output LA Symbolic Coding	
 b. Identify the SID displays that should be generated by 	E	C181-BUIC-WB, Mini-BUI C185-BUIC-ST, AN/GSA-5 C193-416M-SU, Register	C System LA Programming Manual Reference Sheet	
c. Use computer listings to locate given compool tables and items	E	Manual (I) TM 2387/102/01, Assembly and Analysis TO 31Z3-178-18, Programming Manual (J		
d. Analyze the requirements for the radar processing program	Е	Equipment and Training Overhead Projector AN/GSA-51A Computer Sys O26 Card Punch (2) Flowcharting Template	<u>Aids</u> stem (9) (1)	
		Training Methods P 3 hrs(3) Instructional Guidance Preparation of the rada will require both in-c: work by the students. accomplished in five 3	ar processing program lass and out-of-class In-class work will be -hour periods during	
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PLAN OF INSTRUCTION (Continued)						
L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIA	LS AND GUIDANCE		
			the last half of Wk6-D Wk7-Dy4, Wk8-Dy1, and enabling objectives ar these in-class periods on these objectives du period and continued i if required.	y5 (today), Wk7-Dy2, Wk8-Dy3. A group of e listed in each of . Work will be started ring the in-class nto out-of-class time		
		Wk7-Dyl				
3. Field and Character Search Instructions (appropriate references and a set of specifica least one program in assembler language which utilize the character search instruction (CSE least 70% is required for satisfactory achiev 2c,d,f) a. Function and use of the character sea (CSE) b. Code the character search instruction c. Trace the flow of action in a program instruction d. Calculate and analyze the contents of count register (CCR) after a given CSE instru 	Part II). Given tions, write at will correctly). A grade of at ement. (CTS para rch instruction (CSE) using the CSE the character ction	n 3 Instructional Materials Cl75-BUIC-HO, AN/GSA-51A Program Card Cl76-BUIC-HO, AN/GSA-51A Input/C Programming Code Card Cl78-BUIC-HO, AN/GSA-51A Symbol: Sheet Cl81-BUIC-WB, Mini-BUIC System Cl81-BUIC-WB, Mini-BUIC System Cl84-BUIC-WB, AN/GSA-51A Central Programming E Cl85-BUIC-ST, AN/GSA-51A Program Cl93-416M-SU, Register Reference TM 2780/004/00, General Utility Manual (I) TM 2387/102/01, Assembly and Ana TO 31Z3-178-18, Programming Manu E E Equipment and Training Aids Overhead Projector AN/GSA-51A Computer System (9) 026 Card Punch (2) Flowcharting Template (1)		S IA Programming Code IA Input/Output IA Symbolic Coding C System IA Central Processor IA Programming Manual Reference Sheet I Utility User's Iy and Analysis (I) mming Manual (I) <u>Aids</u> stem (9) (1)		
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		DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE
LEARNING OBJECTIVES 4. Floating-Point Instructions (Part I). Gi specifications and appropriate references, wr program in assembler language which will corr the floating-point instructions identified in objectives. A grade of at least 70% is requir tory achievement. (CTS para 2b,c,d,f,h,j,k; 2 a. Identify the advantages of floating-p over fixed-point arithmetic b. Structure of floating-oint data words c. Function and use of: (1) Floating Add (FAD) instruction (2) Floating Subtract (FSU) instruction (3) Floating Multiply (FMU) instruction (4) Floating Divide (FDV) instruction (5) Convert Binary to Floating-Point (6) FLT declarative data word	ven a set of rite at least one rectly utilize in the following red for satisfac- eg(1)) point arithmetic on (CBF) instruction	DURATION (HOURS) 2 6 C (3) E E	3 Training Methods Ds-Dm 2 hrs, P 1 hr(2) Instructional Materials Cl75-BUIC-HO, AN/GSA-51 Card Cl76-BUIC-HO, AN/GSA-51 Programming Code Card Cl78-BUIC-HO, AN/GSA-51 Sheet Cl84-BUIC-HO, AN/GSA-51 Programming Cl85-BUIC-ST, AN/GSA-51 Cl93-416M-SU, Register TM 2780/004/00, General Manual (I) TM 2387/102/01, Assembl TO 31Z3-178-18, Program Equipment and Training Overhead Projector AN/GSA-51A Computer System 026 Card Punch (2) Flowcharting Template (A Programming Code A Input/Output A Symbolic Coding A Central Processor A Programming Manual Reference Sheet Utility User's y and Analysis (I) ming Manual (I) <u>Aids</u> stem (9) 1)
d. Code floating-point instructions and the FLT declarative data word		E	Ds-Dm 4 hrs, P 2 hrs(2))
e. Calculate the floating-point value fr programmer's value	om a given	e Wk7-Dy2		
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES	LEARNING OBJECTIVES DURATION (HOURS) 2		SUPPORT MATERIALS AND GUIDANCE	
		(3)	
f. Calculate the programmer's value from floating-point value	a given	Е		
g. Given the scaling factor and a value i data register, calculate the floating-point eq	in a fixed-point guivalent	Е		
h. Calculate the contents of the store me after the operation of a given CBF instruction	emory location	Е		
5. Mini-BUIC System (Part II). Write a flow f processing program	for the radar	3 E	Instructional Material C181-BUIC-WB, Mini-BUI	<u>s</u> C System
			Equipment and Training Flowcharting Template	Aids (1)
			Training Methods P 3 hrs(3)	
			Instructional Guidance Three instructors show the student's flowchar students having diffic	ld be available to chec ts and to help those culty.
		Wk7-Dy3		
6. Floating-Point Instructions (Part II). Given a set of program specifications and appropriate reference material, write at least one program in assembler language which will correctly utilize the Branch on Condition (BRC) instruction. A grade of at least 70% is required for satisfactory achievement. (CTS para 2c,d,f,h,j,k; 2g(1))		3 C	Instructional Material C175-BUIC-HO, AN/GSA-5 Card C176-BUIC-HO, AN/GSA-5 Programming Code Card C178-BUIC-HO, AN/GSA-5 Sheet	S A Programming Code A Input/Output A Symbolic Coding
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PLAN OF INSTRUCTION (Continued)					
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIA	ALS AND GUIDANCE		
a. Function and use of the BRC instruction b. Code the BRC instructions to test for g conditions	iven E	C184-BUIC-WB, AN/GSA-5 Programming C185-BUIC-ST, AN/GSA-5 C193-416M-SU, Register TM 2780/004/00, Genera Manual (I) TM 2387/102/01, Assemb TO 31Z3-178-18, Progra Equipment and Training Overhead Projector AN/GSA-51A Computer Sys O26 Card Punch (2) Flowcharting Template Training Methods Ds-Dm 2 hrs, P 1 hr(2)	LA Central Processor LA Programming Manual Reference Sheet L Utility User's Ly and Analysis (I) mming Manual (I) <u>Aids</u> stem (9) (1)		
7. Special System Oriented Codes (Part I). Give program specifications and appropriate reference least one program in assembler language which we utilize the special system oriented codes ident: following enabling objectives. A grade of at least required for satisfactory achievement. (CTS para k; 2g(3),(4)) a. Function and use of control codes: (1) SET (2) REL (3) DATA (4) SKP (5) DRUM (6) ORG	en a set of es, write at ill correctly ified in the ast 70% is a 2c,d,f,h,j, C (3) E	Instructional Materials Cl75-BUIC-HO, AN/GSA-52 Card Cl76-BUIC-HO, AN/GSA-52 Programming Code Card Cl78-BUIC-HO, AN/GSA-52 Sheet Cl84-BUIC-WB, AN/GSA-52 Programming Cl85-BUIC-ST, AN/GSA-52 Cl93-416M-SU, Register TM 2780/004/00, General Manual (I) TM 2387/102/01, Assembl TO 31Z3-178-18, Program	S IA Programming Code LA Input/Output LA Symbolic Coding LA Central Processor LA Programming Manual Reference Sheet L Utility User's Ly and Analysis (I) mming Manual (I)		
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE		
b. Code the control codes c. Calculate the assembler output for a given program that uses control codes	E E Wk7-Dy4 (3)	Equipment and Training Aids Overhead Projector AN/GSA-51A Computer System (9) O26 Card Punch (2) Flowcharting Template (1) Training Methods Ds-Dm 4 hrs, P 2 hrs(3)		
 d. Function and use of address declarative codes: (1) ADR (2) ADRA (3) ADRP 	Е			
e. Code the address control codes	Е			
f. Calculate the assembler output for a given program that uses address declarative codes	E			
8. Mini-BUIC System (Part III). Code the radar processing program on AN/GSA-51A Coding Sheets	E	Instructional Materials Cl75-BUIC-HO, AN/GSA-51A Programming Code Sheet Cl76-BUIC-HO, AN/GSA-51A Input/Output Programming Code Card Cl78-BUIC-HO, AN/GSA-51A Symbolic Coding Sheet Cl81-BUIC-WB, Mini-BUIC System Cl85-BUIC-ST, AN/GSA-51A Programming Manual Cl93-416M-SU, Register Reference Sheet TM 2780/004/00, General Utility User's Manual (I) TM 2387/102/01, Assembly and Analysis (I) TO 31Z3-178-18, Programming Manual (I)		
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIA	N S AND GUIDANCE
9. Special System Oriented Codes (Part II). debug programs using special system oriented	Write and codes	2 Wk7-Dy5 3 E	 Equipment and Training Flowcharting Template Training Methods P 3 hrs(3) Instructional Guidance The students should be speed and they should charts as they code. should be available to coding and to help tho difficulties. Instructional Material Cl75-BUIC-HO, AN/GSA-5 Sheet Cl76-BUIC-HO, AN/GSA-5 Programming Code Card Cl78-BUIC-HO, AN/GSA-5 Sheet Cl84-BUIC-HO, AN/GSA-5 Programming Cl85-BUIC-ST, AN/GSA-5 Programming Cl93-416M-SU, Register TM 2780/004/00, General Manual (I) TM 2387/102/01, Assemb TO 31Z3-178-18, Program Equipment and Training AN/GSA-51A Computer Sy 	Aids (1) working at their own be using their flow- Three instructors check the student's se students having S IA Programming Code IA Input/Output IA Symbolic Coding IA Central Processor IA Programming Manual Reference Sheet I Utility User's Iy and Analysis (I) mming Manual (I) <u>Aids</u> stem (9)
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3		
<pre>1 10. Subroutines (Part I). Given a set of specifications and appropriate references, write at least one program in assem- bler language which will correctly utilize the subroutine instructions identified in the following enabling objectives. A grade of at least 70% is required for satifactory achieve- ment. (CTS para 2b,c,d,f,h,j,k; 2g(1)) a. Function and use of subroutine instructions: (1) Subroutine Jump (SRJ) (2) Subroutine Return (SRR) b. Code subroutine instructions</pre>	DURATION (HOURS) 2 C (3) E E	SUPPORIMATERIALS AND GUIDANCE 3 O26 Card Punch (2) Flowcharting Template (1) <u>Training Methods</u> Ds-Dm 1 hr, P 2 hrs(3) <u>Programming Laboratory</u> Have students work on the requirements of the criterion objective for special system oriented codes. <u>Instructional Materials</u> Cl75-BUIC-HO, AN/GSA-51A Programming Code Card Cl76-BUIC-HO, AN/GSA-51A Input/Output Programming Code Card Cl78-BUIC-HO, AN/GSA-51A Symbolic Coding Sheet Cl84-BUIC-WB, AN/GSA-51A Central Processor Programming Cl85-BUIC-ST, AN/GSA-51A Programming Manual Cl93-416M-SU, Register Reference Sheet TM 2780/004/00, General Utility User's Manual (I) TM 2387/102/01, Assembly and Analysis (I) TO 31Z3-178-18, Programming Manual (I)		
 c. Advantages of external subroutines and internal subroutines d. Trace the flow of action resulting from a given PCR subroutine 		Equipment and Training Aids Overhead Projector AN/GSA-51A Computer System (9) 026 Card Punch (2)		
PLAN OF INSTRUCTION NO. 3AZR27370 D DATE 8 April 1	.970	Flowcharting Template (1) BLOCK NO. III PAGE NO. 27		

PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE		
		Training Methods Ds-Dm 6 hrs		
	Wk8-Dyl			
	(3)			
e. Trace the flow of action resulting from a given SRJ subroutine	E			
f. Function and structure of the subroutine address register (SAR) and the subroutine storage register (SSR)	E ···			
11. Mini-BUIC System (Part IV). Punch the radar processing program on cards	E	<pre>Instructional Materials Cl75-BUIC-HO, AN/GSA-51A Programming Code Card Cl76-BUIC-HO, AN/GSA-51A Input/Output Programming Code Card Cl78-BUIC-HO, AN/GSA-51A Symbolic Coding Sheet Cl81-BUIC-WB, Mini-BUIC System Cl85-BUIC-ST, AN/GSA-51A Programming Manual Cl93-416M-SU, Register Reference Sheet TM 2780/004/00, General Utility User's Manual (I) TM 2387/102/01, Assembly and Analysis (I) TO 31Z3-178-18, Programming Manual (I) Equipment and Training Aids AN/GSA-51A Computer System (9) 026 Card Punch (2) Flowcharting Template (1)</pre>		
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PLAN OF INSTRUCTION	ON (Continued)	
L EARNING OBJECTIVES	DU RATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE
	Wk8-Dy2	Training Methods P 3 hrs(3) <u>Instructional Guidance</u> Two instructors should assist those studen who have not completed the project through this objective. A third instructor should assemble the programs of the students who have finished punching their programs.
12. Subroutines (Part II). Write and debug programs using subroutine instructions	E	Instructional Materials Cl75-BUIC-HO, AN/GSA-51A Programming Code Card Cl76-BUIC-HO, AN/GSA-51A Input/Output Programming Code Card Cl78-BUIC-HO, AN/GSA-51A Symbolic Coding Sheet Cl84-BUIC-WB, AN/GSA-51A Central Processor Programming Cl85-BUIC-ST, AN/GSA-51A Programming Manua Cl93-416M-SU, Register Reference Sheet TM 2780/004/00, General Utility User's Manual (I) TM 2387/102/01, Assembly and Analysis (I) TO 31Z3-178-18, Programming Manual (I) Equipment and Training Aids AN/GSA-51A Computer System (9) 026 Card Punch (2) Flowcharting Template (1)
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PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES		DU RATION (HOURS) 2	SUPPORT MATERIA	als and guidance
			Training Methods Ds-Dm l hr, P 2 hrs(3)	
			Programming Laboratory Review all subroutine is students work on the re- criterion objective for	instructions and have equirements of the r subroutines.
13. Interrupt System. Given a set of specific appropriate references, write at least one probler language which will correctly utilize the instructions identified in the following enabled A grade of at least 70% is required for satistications	ications and cogram in assem- ne interrupt oling objectives. sfactory achieve-	6	Instructional Materials C175-BUIC-HO, AN/GSA-51 Card C176-BUIC-HO, AN/GSA-51 Programming Code Card	A Programming Code
ment. (CIS para 20, c, d, f, h, j, K; 2g(1))	atem	C (3) E	CL76-BOIC-HO, AN/GSA-51 Sheet C184-BUIC-WB, AN/GSA-51 Programming C185-BUIC-ST AN/GSA-51	A Central Processor
b. Identify the modes of control association interrupt system	ated with the	E	TO 31Z3-178-18, Program Equipment and Training	Ming Manual (I)
c. Identify the twelve interrupts		Е	AN/GSA-51A Computer Sys 026 Card Punch (2)	stem (9)
d. Identify the causes of and the respontive interrupts	nses to the	Е	Flowcharting Template ((1)
e. Function and purpose of the twelve interrupts		Е	Ds-Dm 4 hrs, P 2 hrs(3))
f. Function and use of special registers and the table associated with the interrupt system		Е	Instructional Guidance Show the transparency of (IRJ) routine.	of the interrupt jump
g. Function and use of the interrupt ins (1) Load Special Register (LSR)	structions:			
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PLAN OF INSTRUCTION (Continued)				
	DU RATION (HOURS) 2	SUPPORT MATERIA 3	al 5 AND GUIDANCE	
(2) Interrupt Return (IRR) (3) Store External Request (SER)	Е			
h. Code interrupt instructions	Е			
	Wk8-Dy3 (3)		and an	
i. Write and debug programs using interrupt instructions	E	Programming Laboratory Complete enabling object vious day. Have student ments of the criterion interrupt system. If ti complete programs assig	tives from the pre- is work on the require- objective for the me permits, have them and in previous units.	
14. Mini-BUIC System (Part V)	3.	Instructional Materials	A Programming Code	
a. Assemble and cycle the radar processing program		Card	A Transt (Outrast	
b. Debug the radar processing program	Е	Programming Code Card C178-BUIC-HO, AN/GSA-51 Sheet C181-BUIC-WB, Mini-BUIC C185-BUIC-ST, AN/GSA-51 C193-416M-SU, Register	A Symbolic Coding System A Programming Manual Reference Sheet	
PLAN OF INSTRUCTION NO. 347P27370 D	70	TM 2780/004/00, General Manual (I) TM 2387/102/01, Assembl TO 31Z3-178-18, Program Equipment and Training AN/GSA-51A Computer Sys 026 Card Punch (2)	Utility User's y and Analysis (I) ming Manual (I) <u>Aids</u> item (9)	

PLAN OF INSTRUCTION (Continued)				
L EARNING OBJECTIVES		DURATION (HOURS) 2	SUPPORT MATERIA	L S AND GUIDANCE
		2	Flowcharting Template (<u>Training Methods</u> P 3 hrs(3) <u>Instructional Guidance</u> Take students to the co and operate their progr dents who are having di their program. At least required in the classro debug student programs assembled, a second ins operate the computer, a is required in the comp	1) mputer and assemble rams. Assist those stu- fficulty with cycling one instructor is bom to help analyze and which have already been structor is required to and a third instructor puter room to analyze
		We 8-Duel	listings and dumps. The major problems should b classroom for assistance problems should be enco errors and submit corre	ese students having be returned to the se; those with minor buraged to find the sctions immediately.
15. Measurement		6	Instructional Materials Cl75-BUIC-HO, AN/GSA-51 Card Cl76-BUIC-HO, AN/GSA-51 Programming Code Card Cl78-BUIC-HO, AN/GSA-51 Sheet Cl85-BUIC-ST, AN/GSA-51 Cl93-416M-SU, Register TM 2780/004/00, General Manual (1)	A Programming Code A Input/Output A Symbolic Coding A Programming Manual Reference Sheet Utility User's
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	PLAN OF IN	ISTRUCTION	N (Continued)	
L EARNING OBJECTIVES			DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE
				ATCR 52-3, Measurement (I) ATCR 52-29, Student Critique Program (I) Equipment and Training Aids
				Flowcharting Template (1)
				TP 4 ¹ / ₂ hrs, Ds 1 ¹ / ₂ hrs Instructional Guidance
			(4 <u></u> 물	
a. Examination				Administer the examination in accordance with current policies, procedures, and regulations.
			(1]	
b. Critique	. •			Critique the examination in accordance with applicable policies and procedures.
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