



2016

Customer Training Schedule



TECHNICAL MANUALS ON ELECTRONIC MEDIA

Manuals for most Fives Giddings & Lewis machines can be provided on CD-ROM in printable Adobe® Acrobat® PDF format. Consult the Training & Documentation Department for the availability of the desired operator, programming, electrical maintenance, or mechanical maintenance (less layout drawings) manuals. Cost is \$250.00 per set of manuals on CD for each machine. Additional CD copies are \$25.00 each.

Table of Contents

FOND DU LAC TRAINING COURSE POLICY & FEE SCHEDULE	3
2016 TRAINING SCHOOL SCHEDULE.....	4
ON-SITE PROBE TRAINING SCHOOL.....	4
ENROLLMENT INFORMATION	13
MAPS	14
FIVES GIDDINGS & LEWIS ENROLLMENT FORM.....	16



FOND DU LAC TRAINING COURSE POLICY & FEE SCHEDULE

TRAINING AT FOND DU LAC:

One training credit allows a person to attend a Training Course at the Fond du Lac factory training facility. The customer has from the date the order was placed until one year after shipment to use the credits. All travel and living expenses are the responsibility of the customer. Contact the Training Department to check on the status of the remaining credits.

Fives Giddings & Lewis reserves the right to modify or cancel a course if there is insufficient enrollment. In the event a course is changed, enrollees will be given first priority in a rescheduled course. Fives Giddings & Lewis is not responsible for additional customer's transportation charges due to cancellation.

If training credits were not part of the machine transaction or not used during the specified time period, the training cost for current products and controls is \$2100 per student for a 4-1/2 day course and \$1400 per student for a 3 day course.

ON-SITE TRAINING AT THE CUSTOMER'S FACILITY

1. STANDARD TRAINING COURSES

All the regularly published training courses can be conducted in the customer's facility. Dates will be scheduled based on instructor availability.

2. SPECIAL TRAINING

Special training courses can be established to suit a customer's needs and conducted either in Fond du Lac or at the customer's facility.

3. LEGACY Training

Special training courses can be established to suit a customer's needs and conducted either in Fond du Lac or at the customer's facility. The following courses are subject to Instructor availability:

- G&L NumeriPath 800
- G&L NumeriPath 8000
- Fanuc 15B
- Fanuc 15i
- Fanuc 16i

4. COST OF TRAINING

Cost for Domestic On-site training (held at the customer's facility) is as follows:

- 4-½ Day course \$9800
- 3-½ Day course \$8500
- 3 Day course \$8000

Travel and lodging expenses of the instructor are included.

All prices are based on a maximum of six students per class; the cost for each additional student is \$400.

Cost for Foreign On-Site training will be quoted upon request.

Prices for In-House and On-Site classes are subject to change without prior notification.

Each training credit can be used towards customer On-Site training at the rate of \$450 per credit.



2015 TRAINING SCHOOL SCHEDULE

2016 Training Schedule (Fond du Lac, WI)														
	Title	Course Length (Days)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Programming	Fanuc													
	Fanuc 30i / 31i (Turning)	4 1/2			7-11				11-15				7-11	
	Fanuc 30i / 31i (Milling)	4 1/2	18-22				16-20				19-23			
	Fanuc 30i / 31i (Advanced)	3	Available upon request											
	Siemens													
	Siemens 840D (Turning)	4 1/2				11-15				1-5				5-9
Siemens 840D (Milling)	4 1/2		22-26					13-17			10-14			
Maintenance	Electrical													
	Fanuc 30i / 31i (All Machines)	4 1/2	25-29					9-13				17-21		
	Siemens 840D (All Machines)	4 1/2		29-4						8-12			28-2	
	Mechanical													
	HBM PT / RT / MC / FT (480 / 485 Series)	4 1/2			14-18			20-24		15-19		31-4		
	HBM FTR (484 / 486 Series)	4 1/2		8-12										
	HMC 1250 / 1600 (568 Series)	4 1/2				18-22					12-16			5-9
	VTC 1250-3500 (523-526 Series)	4 1/2	11-15					23-27					3-7	
	Combined Mechanical & Electrical													
	Fanuc 30i / 31i (All Machines)	4 1/2	Available upon request											
Siemens 840D (All Machines)	4 1/2	Available upon request												

4 1/2 Day School

Monday - Thursday: 8:00 A.M. - 4:00 P.M.

Friday: 8:00 A.M. - 12:00 P.M.

3 Day School

Tuesday - Thursday: 8:00 A.M. - 4:00 P.M.

ON-SITE PROBE TRAINING SCHOOL

Probe training classes are to be conducted at the customer facility on your machine(s). Care and maintenance of the probe hardware, programming of the probe and probing results processing is covered. Consult the factory to schedule a class.

Probe Training	Course length (days)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Siemens	3 1/2	Consult the Factory to Schedule											
Fanuc	3 1/2	Consult the Factory to Schedule											



COURSE OUTLINES

All outlines shown are for typical schools and can be altered to suit customer requirements

Course Name:	Programming - Fanuc Series 30i / 31i Controls
Course Length:	4 ½ days
Target Audience:	Machine Operators & Part Programmers
Course Description:	This course will introduce the programming techniques required to efficiently utilize the features and capabilities of Fives Giddings & Lewis machine tools equipped with Fanuc controls.

Day 1 - Monday

1. GENERAL INTRODUCTION
 - a. Instructor / student introduction
 - b. Class introduction
2. PRODUCT AWARENESS
 - a. Safety
 - b. Machine descriptions
 - c. Cover individual machine specifications
3. CONTROL DESCRIPTION
 - a. Explain general control information
 - b. Explain the operator CRT display pages
 - c. Explain buttons on the operator station
 - d. Explain & demonstrate transfer / edit of programs

Day 2 - Tuesday

4. GIDDINGS & LEWIS CUSTOM SCREENS
 - a. Explain custom screens
5. COORDINATE SYSTEMS
 - a. Explain Cartesian / polar coordinate systems
6. PROGRAM CODES
 - a. Programming data
 - b. Letter address codes
 - c. Preparatory codes (G codes)
 - d. Miscellaneous codes (M codes)
 - e. Canned cycles

Day 3 - Wednesday

7. DISCUSS BASIC APPLICATIONS
 - a. References
 - b. Tool selection / tool changer operation
 - c. Tool compensation
 - d. Rotary axes
8. PROGRAMMING EXAMPLES
9. SPECIAL FUNCTIONS
 - a. Variables
 - b. Mathematics
 - c. Decision making/branching
 - d. Printing
 - e. Subprograms & macros

Day 4 - Thursday

10. PROGRAMMING EXAMPLES
11. OPTIONS
 - a. Tool management
 - b. Spindle load monitor
 - c. Probing
 - i. Part probing
 - ii. Tool probing

Day 5 - Friday

12. PROGRAMMING EXAMPLES
13. CLASS WRAP-UP



Course Name: Advanced Programming - Fanuc Series 30i / 31i Control
Course Length: 3 days
Target Audience: Advanced Machine Operators & Part Programmers
Course Description: This course will introduce the experienced programmer to the unique features and capabilities available on Fives Giddings & Lewis machine tools equipped with Fanuc controls. This course deals with Custom Macro B programming. Class content may vary depending upon the needs of the class, but may include any or all of the following topics.
Prerequisite: Attended Fanuc Program training or have a working knowledge in G-Code programming.

Day 1 - Tuesday

1. GENERAL INTRODUCTION
 - a. Instructor / student introduction
 - b. Class introduction
2. CNC SYSTEM REVIEW
 - a. The CNC function
 - b. The PMC function
 - c. The Machine function
3. CNC OPERATION
 - a. Mode selection
 - b. Macro program protection
 - i. Checking parameters
 - ii. Setting parameter write enable
 - c. Start a new program
 - d. Inserting, altering & deleting program lines
 - e. Program directory list
4. MACRO VARIABLES
 - a. Referencing commands with macro
 - i. Limitations of macro commands
 - ii. Specifying a system variable by name
 - iii. Using the SETVN function to set a common variable
 - b. Local, common & system variables
 - c. Storing values into variables
 - d. Referencing a variable with another variable

Day 2 - Wednesday

5. MACRO ARITHMETIC INSTRUCTIONS
 - a. Simple arithmetic functions
 - b. Mathematics equations
 - c. Trigonometric functions
 - d. Scientific functions
6. DECISIONS & LOOPS
 - a. IF statement
 - b. IF/WHEN statement
 - c. If/THEN statement
 - d. Complex conditional expressions
 - e. WHILE/DO statement
7. MACRO / SUBPROGRAM CALLS
 - a. M98 Subprogram call
 - b. G65 simple call
 - c. G66 & G66.1 modal call
 - d. Macro and subprogram calls using G & M codes

Day 3 - Thursday

8. EXTERNAL OUTPUT / INPUT COMMANDS
 - a. External output commands
 - i. DPRNT
 - ii. POPEN
 - iii. PCLOS
9. PARAMETERS OF INTEREST
10. MACRO PROGRAMMING EXAMPLES



Course Name: Programming - Siemens 840D Control
Course Length: 4 ½ days
Target Audience: Machine Operators & Part Programmers
Course Description: This course will introduce the programming techniques required to efficiently utilize the features and capabilities of Fives Giddings & Lewis machine tools equipped with Siemens controls.

Day 1 - Monday

1. GENERAL INTRODUCTION
 - a. Instructor / student introduction
 - b. Class introduction
2. PRODUCT AWARENESS
 - a. Safety
 - b. Machine descriptions
3. CONTROL DESCRIPTION
4. MACHINE ZERO POSITIONS
5. FOUR AXIS CONTROL (if applicable)
6. CHUCKING (if applicable)
7. LIVE SPINDLE OPTION (if applicable)
8. ROTARY TABLE (if applicable)
9. POLAR COORDINATE & PERIPHERAL SURFACE TRANSFORMATIONS (if applicable)
10. PALLET CONTROL (if applicable)

Day 2 - Tuesday

11. CONTROL PANEL LAYOUT
12. MACHINE OPERATOR DEVICES
13. OPERATING PROCEDURES
14. PART PROGRAM OPERATIONS
15. BLOCK SEARCH
16. TOOL OFFSETS
17. TOOL MANAGEMENT
18. TOOL CHANGER

Day 3 - Wednesday

19. REFERENCE OFFSETS
20. PROGRAM DATA
21. PROGRAMMING CODES

Day 4 - Thursday

22. SPECIAL PROGRAMMING FUNCTIONS
23. PROGRAMMING EXAMPLES
24. HAND HELD UNIT
25. CAMERA SETUP
26. COOLANT
27. CHIP CONVEYOR

Day 5 - Friday

28. PROBING
29. PROBING OPERATIONS
30. ATTACHMENTS (if applicable)



Course Name: Electrical Maintenance - Fanuc 30i & 31i Control
Course Length: 4 ½ days
Target Audience: Electrical Maintenance Personnel
Course Description: This course gives an overview of the material in the electrical manual and the machine electrical prints. Material is covered in a progressive manner. A primary goal of the class is to familiarize each student with the documentation provided with the machine. This will enable the student to use the documentation effectively for troubleshooting control or machine problems.
Prerequisites: Electronics or electrical maintenance background and good working knowledge of CNC equipment.

Day 1 - Monday

1. GENERAL INTRODUCTION
 - a. Welcome and class introduction
 - b. Electrical service manual overview
2. MACHINE & CONTROL DESCRIPTIONS
 - a. Work order review
 - b. Machine description
 - c. Block diagram of control
3. SOFTWARE ORGANIZATION
 - a. Saving SRAM
 - b. Loading part programs
 - c. Backup battery information
 - d. NC parameters
 - e. PMC D word organization

Day 2 - Tuesday

4. CONTROL & MACHINE OPERATIONS
 - a. The position page
 - b. Control operations modes
 - c. Manual data input
 - d. System security & passwords
 - e. Referencing the axes
 - f. Referencing tooling
5. EXPLANATION OF THE PRINTS
 - a. How to read prints
 - b. Use of table of contents
 - c. Grounding and power requirements
 - d. Page by page review of the prints

Day 3 - Wednesday

6. EXPLANATION OF THE PRINTS
 - a. Page by page review of the prints
 - b. Coolant & chiller systems
 - c. Probing systems
7. SERVO SYSTEM
 - a. Block diagram of servo system
 - b. Troubleshooting encoder feedback
 - c. Spindle and axis drives

Day 4 - Thursday

8. SETUP INFORMATION
 - a. Machine reference setup procedures
 - b. Software end limit information
 - c. Communications
 - d. Probing information
9. TOOL CHANGER & PALLET CHANGING
 - a. Hardware descriptions
 - b. Setups & maintenance procedures

Day 5 - Friday

10. COMPENSATION INFORMATION
 - a. Pitch compensation
 - b. Backlash compensation
 - c. Thermal compensation
11. TWENTY QUESTION POST TEST
12. CLASS WRAP-UP



Course Name: Electrical Maintenance - Siemens 840D Control
Course Length: 4 ½ days
Target Audience: Electrical Maintenance Personnel
Course Description: This course gives an overview of the material in the electrical manual and the machine electrical prints. Material is covered in a progressive manner. A primary goal of the class is to familiarize each student with the documentation provided with the machine. This will enable the student to use the documentation effectively for troubleshooting control or machine problems.
Prerequisites: Electronics or electrical maintenance background and good working knowledge of CNC equipment.

Day 1 - Monday

1. GENERAL INTRODUCTION
 - a. Welcome and class introduction
 - b. Electrical service manual overview
 - c. 840D control system block diagram
2. DIAGNOSTICS DESCRIPTION
 - a. Types of diagnostics
 - b. CNC diagnostics
 - c. Troubleshooting with the diagnostics
3. SOFTWARE ORGANIZATION
 - a. System software loading
 - b. Loading part programs
 - c. Backup battery information

Day 2 - Tuesday

4. CONTROL & MACHINE OPERATIONS
 - a. The active data page
 - b. Control operations modes
 - c. Manual data input
 - d. System security & passwords
 - e. Referencing the axes
5. EXPLANATION OF THE PRINTS
 - a. How to read prints
 - b. Use of table of contents
 - c. Grounding and power requirements
 - d. Page by page review of the prints

Day 3 - Wednesday

6. EXPLANATION OF THE PRINTS (cont.)

- a. Page by page review of the prints

7. SERVO SYSTEM

- a. Block diagram of servo system
- b. Troubleshooting the feedback system
- c. Theory and operation of axis drives
- d. Theory and operation of spindle drive
- e. Using the servo trace function

Day 4 - Thursday

8. SETUP INFORMATION

- a. Overview safety integrated
- b. Clearing safety integrated messages
- c. Machine reference setup
- d. Software end limit information
- e. Communications
- f. Probing Information

9. TOOL CHANGER & PALLET CHANGING

- a. Hardware descriptions
- b. Setups & maintenance procedures

Day 5 - Friday

10. COMPENSATION INFORMATION

- a. Interpolary compensation
- b. Backlash compensation
- c. Thermal compensation

11. TWENTY QUESTION POST TEST

12. CLASS WRAP-UP



Course Name: Mechanical Maintenance
Course Length: 4 ½ days
Target Audience: Mechanical Maintenance Personnel
Course Description: This course provides an overview of the material in the mechanical maintenance manual. A primary goal of the class is to familiarize each student with the documentation provided with the machines. This will enable the student to use the documentation effectively for troubleshooting, ordering the proper part(s) when needed and for doing machine repair.
Prerequisites: Basic understanding of how to read mechanical drawings and hydraulic schematics.

Day 1 - Monday

1. GENERAL INTRODUCTION
 - a. Instructor / student introduction
 - b. Class introduction
2. PRODUCT AWARENESS
 - a. Safety
 - b. Machine descriptions
 - c. Cover individual work orders
3. MAJOR MACHINE AXIS
 - a. Major components
 - b. Common components
 - c. Maintenance procedures
 - d. Review prints

Day 2 - Tuesday

4. HEADSTOCK
 - a. Description of headstocks
 - b. Components
 - c. Maintenance procedures
 - d. Review prints
5. SERVICE SYSTEMS
 - a. Maintenance note plates
 - b. Hydraulics
 - c. Pneumatics
 - d. Lubrication
 - e. Coolant system

Day 3 - Wednesday

6. TABLE
 - a. Description
 - b. Components
 - c. Maintenance procedures
 - d. Review prints
7. PALLET CHANGER
 - a. Description
 - b. Components
 - c. Maintenance procedures
 - d. Review prints

Day 4 - Thursday

8. TOOL CHANGER
 - a. Description
 - b. Components
 - c. Maintenance procedures
9. SCALES
 - a. Description
 - b. Components
 - c. Assembly procedures
 - d. Maintenance

Day 5 - Friday

10. INSTALLATION
11. ALIGNMENTS



Course Name: Combined Mechanical & Electrical Maintenance
Course Length: 4 ½ days
Target Audience: Maintenance personnel that perform both mechanical and electrical duties.
Course Description: This course gives an overview of the material in both the Mechanical and Electrical manuals and the Mechanical and Electrical prints. Material is covered in a progressive manner. A primary goal of the class is to familiarize each student with the documentation provided with the machine. This will enable the student to use the documentation effectively for troubleshooting control or machine problems.
Prerequisites: A CNC machine tool maintenance background and good working knowledge of CNC equipment, hydraulic and pneumatic systems.

Day 1 - Monday

1. GENERAL INTRODUCTION
 - a. Welcome and class introduction
 - b. Documentation overview
2. MACHINE & CONTROL DESCRIPTIONS
 - a. Work order review
 - b. Machine description
3. CONTROL ORGANIZATION
 - a. Viewing the control screens
 - b. Backing up the system software
 - c. Loading part programs

- d. Oil & glycol chiller systems
- e. Probing systems
- f. Pitch & backlash compensation
- g. Thermal compensation system

Day 4 - Thursday

6. SERVO SYSTEM & FEEDBACKS
 - a. Block diagram of servo system
 - b. Spindle and axis drives
 - c. Encoder feedbacks
7. SETUP PROCEDURES
 - a. Machine reference setup procedures
 - b. Software end limit information
 - c. Tool changer information & setups
 - d. Pallet changer information & setups

Day 2 - Tuesday

4. EXPLANATION OF THE PRINTS
 - a. How to read the mechanical prints
 - b. How to read the electrical prints
 - c. Machine note plates
 - d. Page by page review of the prints
 - e. Vendor documentation

Day 5 - Friday

8. MACHINE ALIGNMENTS
 - a. Alignments to check
 - b. Machine adjustments
 - c. Post collision recommendations
9. TWENTY QUESTION POST TEST
10. CLASS WRAP-UP

Day 3 - Wednesday

5. SERVICE SYSTEMS
 - a. Hydraulics
 - b. Lubrication systems
 - c. Coolant system & chip conveyors



Course Name: Probing
Control: Fanuc with Renishaw Cycles
Siemens with Siemens Probe Cycles
Course Length: 3 ½ Days
Target Audience: Machine Operators & Part Programmers
Course Description: This course will show students how to set-up, operate, calibrate, and measure using the part probe on your machine. The training is control specific. The outline is the same for both the Fanuc and Siemens controls.

Day 1 - Tuesday

1. GENERAL INTRODUCTION
 - a. Instructor / student introduction
2. PROBE INTRODUCTION
 - a. Stylus installation
 - b. Batteries installation
 - c. Reviewing the current probe settings
 - d. Changing the probe settings / partnering the probe and RMI unit
 - e. Cleanliness
3. INDICATING THE PROBE STYLUS
4. PROBE OFFSETS
5. PROBE CONFIGURATION BITS
6. PROBE FUNCTIONS
7. PROBE M-CODES
8. PROBE PROTECTION

Day 2 - Wednesday

9. PROBE CALIBRATION
 - a. Offsets
 - b. Procedure
 - c. Input variables
 - d. Program example

10. MEASURING CYCLES

- a. Input variables
- b. Surface condition alarms
- c. Program examples

11. PROBE OUTPUT VARIABLES

- a. Output variables capabilities

12. PROBING DIAGNOSTICS

13. CALIBRATE THE PROBE ON THE MACHINE

Day 3 - Thursday

14. PROBE MEASURING EXAMPLE IN THE WORKBOOK

15. PROBE A SURFACE ON THE MACHINE

16. PROBE AN INSIDE DIAMETER ON THE MACHINE

17. PROBE AN OUTSIDE DIAMETER ON THE MACHINE

18. VIEW CUSTOMERS EXAMPLE PART

19. PROGRAM CUSTOMERS EXAMPLE PART

Day 4 - Friday

20. PROBE CUSTOMERS EXAMPLE PART

21. QUESTIONS



ENROLLMENT INFORMATION

1. Class size is limited to maximize the benefit to our students. It is advisable to enroll early as registration is accepted on a first come, first serve basis. Contact the Training Administrator at the Fives Giddings & Lewis, LLC Fond du Lac Training & Documentation Department. Phone: (920) 906-2437
Have available the Model, Serial Number and type of Control for your machine(s).
2. An enrollment form (see page 15) should be completed and returned to:

Training & Documentation Department
Attn: Training Administrator

Fives Giddings & Lewis, LLC
142 Doty Street, P.O. Box 590
Fond du Lac, WI 54936-0590
Email: fivesmsi-train@fivesgroup.com
Fax: (920) 906-2066
3. A letter of confirmation will be sent to the customer prior to each school and will include details regarding class time, location, and a map.
4. Fives Giddings & Lewis has negotiated corporate rates with the Retlaw Hotel, Holiday Inn, Comfort Inn, and Country Inn & Suites. Please present your confirmation letter at check-in to obtain the preferred rate.
5. Classes are conducted from 8:00 A.M. to 4:00 P.M. Monday through Thursday and 8:00 A.M. to Noon on Friday. Classes with duration of 3 days will start on Tuesday. Return reservations should be made for mid-afternoon flights on Friday.

TUITION POLICY

If training was included in the purchase price of your machine(s), the customer has from the date the order was placed until one year after shipment to use the course credits and receive training at no charge. If course credits were not part of the machine transaction or not used during the specified time period, the training cost for current products and controls is \$2100 per student in a 4-1/2 day course and \$1400 per student in a 3 day course.

PAYMENT OF FEES

If a tuition fee is applicable, a purchase order, credit card information, or a check must accompany the enrollment form. Invoices for course fees will be submitted the week of the training session. If you prefer to pay in advance, checks should be made payable to Fives Giddings & Lewis, LLC and sent directly to the Training & Documentation Department in Fond du Lac, WI.

CANCELLATIONS

Fives Giddings & Lewis reserves the right to modify the schedule and cancel schools. In the event a school is canceled, enrollees will be given first priority in the next regularly scheduled school. Customers who have prepaid will be given the option of a refund or accrual for the next class.

OTHER EXPENSES

Fees include tuition and course materials. The customer is responsible for expenses such as travel, lodging, food, cabs, car rentals, and any incidental expenses.

CLOTHING REQUIREMENTS

A portion of the student's time will be spent on the manufacturing floor. Attire while in school is casual but the **students must wear safety toe shoes in the manufacturing area**. Tennis shoes and other soft-soled shoes are not allowed. Students should bring their own safety glasses, or Fives Giddings & Lewis will issue plastic glasses for temporary use.

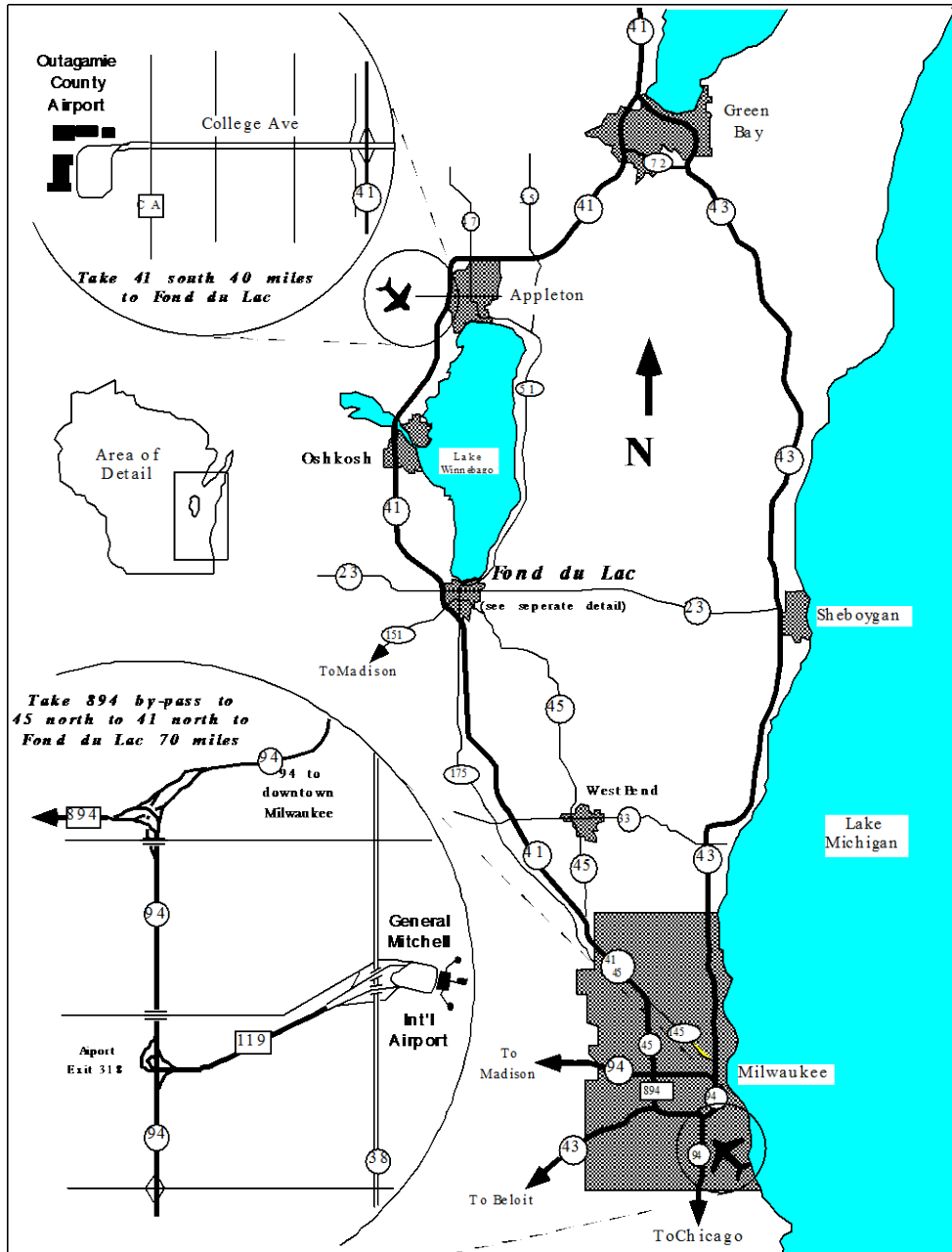
FOR MORE INFORMATION CONTACT:

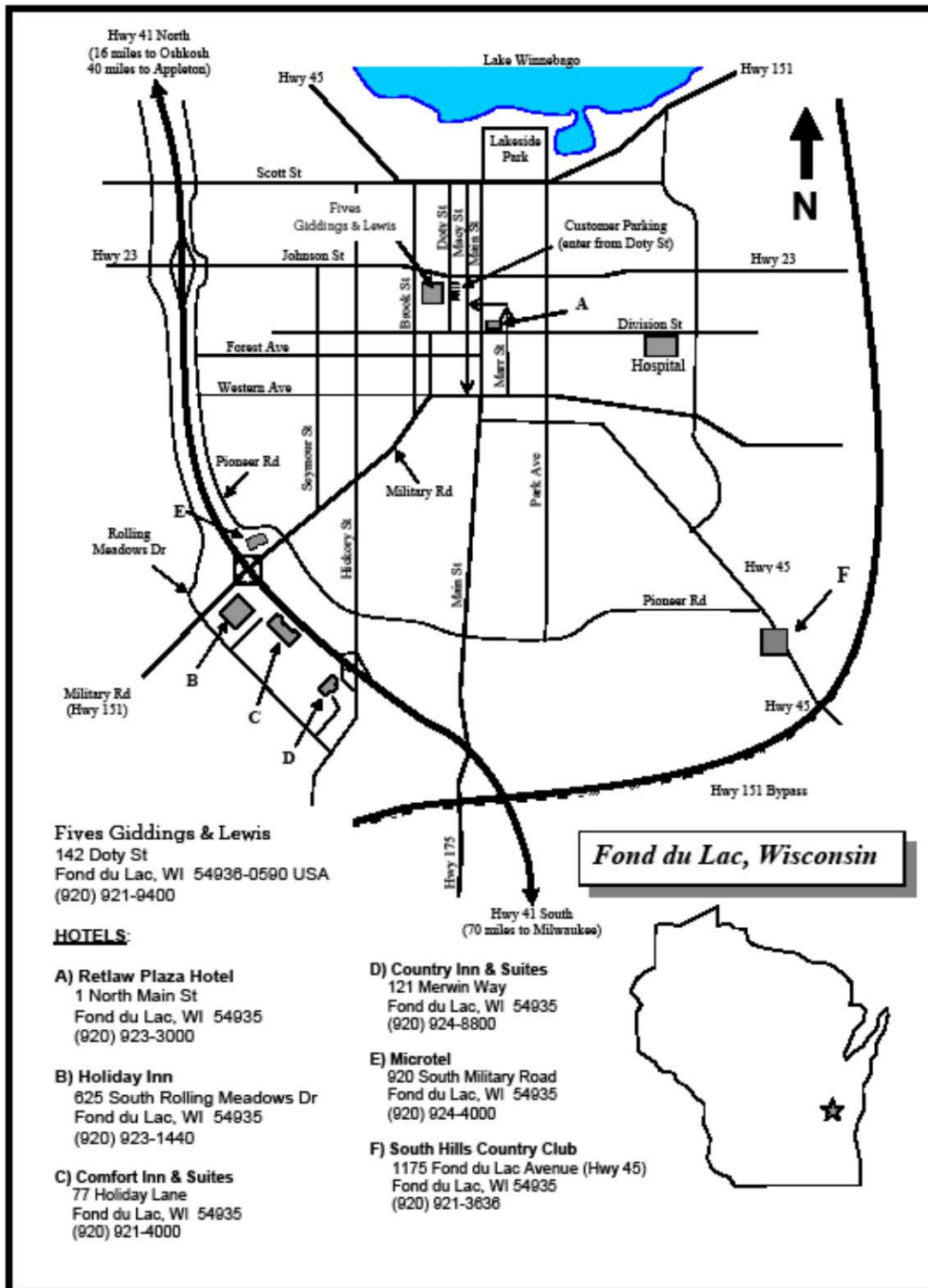
Training & Documentation Department
Attn: Training Administrator
Fives Giddings & Lewis, LLC
142 Doty Street, P.O. Box 590
Fond du Lac, WI 54936-0590
Phone: (920) 906-2437
Email: fivesmsi-train@fivesgoup.com
Fax: (920) 906-2066



fives

MAPS







FIVES GIDDINGS & LEWIS ENROLLMENT FORM

PLEASE PRINT ALL ENTRIES AND RETURN TO: TRAINING ADMINISTRATOR
fivesmsi-train@fivesgroup.com
PHONE: (920) 906-2437
FAX: (920) 906-2066

TYPE OF SCHOOL (CHECK ONLY ONE)

ELECTRICAL

MECHANICAL

PROGRAMMING

COURSE TITLE _____

STARTING DATE _____

MACHINE SERIAL NUMBER (**Must be included**) _____

STUDENT NAMES _____

TITLE _____

DEPARTMENT NAME _____

COMPANY _____

ADDRESS _____

CITY & STATE _____ ZIP CODE _____

CONTACT NAME _____

TITLE _____

DEPARTMENT NAME _____

E-MAIL ADDRESS _____

PHONE NUMBER _____ FAX _____

Fives Giddings & Lewis, LLC
142 Doty Street, P.O. Box 590
Fond du Lac, WI 54936-0590