This document is intended to help education and training institutions deliver the Machine Tool Advanced Skills Technology (MAST) curriculum to a variety of individuals and organizations. MAST consists of industry-specific skill standards and model curricula for 15 occupational specialty areas within the U.S. machine tool and metals-related industries. This volume is organized in the following sections: (1) career development—information on establishing and operating career development centers that help students prepare for careers in the machining and machine tool industries; (2) career action plans—the methods and procedures for developing a career path in the industries for high school students, displaced workers, and employees who want to upgrade their skills; (3) career orientation modules—a 6-week or 180-hour self-paced introduction to the basic hand tools, practices, and equipment used in the machine tool and metal-working occupations; (4) sample internship agreement; (5) outlines of eight remediation courses (three reading, two English, and three mathematics) developed to raise students' skills and knowledge to the level necessary to succeed in college; (6) 11 general education courses (four English, three mathematics, one physics, and three psychology) to be offered in conjunction with the technical courses; and (7) MAST Remote Site and Industrial Model—guidelines for using the MAST technical curricula as a base in preparing customized training for industry customers to update the skills of current employees. Appendixes containing forms necessary to market, plan and implement, the MAST training model and sample training modules are included. (KC)
Machine Tool Advanced Skills Technology

COMMON GROUND:
TOWARD A STANDARDS-BASED TRAINING SYSTEM FOR THE U.S. MACHINE TOOL AND METAL RELATED INDUSTRIES

VOLUME 2

CAREER DEVELOPMENT

of a 15 volume set of Skills Standards and Curriculum Training Materials for the PRECISION MANUFACTURING INDUSTRY

Supported by the Office of Vocational & Adult Education U.S. Department of Education
Machine Tool Advanced Skills Technology Program

VOLUME 2

CAREER DEVELOPMENT, GENERAL EDUCATION AND REMEDIATION

Supported by
The Office of Vocational and Adult Education
U.S. Department of Education

September, 1996
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Discrimination: Title VI of the Civil Rights Act of 1964 states: “No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.” Title IX of the Education Amendments of 1972 states: “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance.” Therefore, the Machine Tool Advanced Skills Technology (MAST) project, like every program or activity receiving financial assistance from the U.S. Department of Education, operated in compliance with these laws.
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- MAST Consortia of Employers and Educators

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INDUSTRIES

COLLEGE AFFILIATES

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MAST PROJECT EVALUATORS
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Dr. Hugh Rogers recognized the need for this project, developed the baseline concepts and methodology, and pulled together industrial and academic partners from across the nation into a solid consortium. Special thanks and singular congratulations go to Dr. Rogers for his extraordinary efforts in this endeavor.

This report is primarily based upon information provided by the above companies, schools and labs. We sincerely thank key personnel within these organizations for their commitment and dedication to this project. Including the national survey, more than 3,000 other companies and organizations participated in this project. We commend their efforts in our combined attempt to reach some common ground in precision manufacturing skills standards and curriculum development.

This material may be found on the Internet at http://machinetool.tstc.edu
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- Executive Summary
- Statement of the Problem
- Machine Tool Advanced Skills Technology Project
- Project Goals and Deliverables
- Project Methodology
- Project Conclusions and Recommendations
- Appendices

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Foreword

Providing education and training in machine tool and metals-related occupations requires more than just high-quality technical courses. Community colleges and other education and training providers must be able to attract people to their programs, help them plan their career paths, and provide them with remedial training (if necessary) and general education training. They also need to be able to work with industry, both to build a path for their students to find jobs, and to meet the training needs of the companies’ existing workers.

Volume 2 is intended to help education and training institutions deliver the MAST curriculum to a variety of individuals and organizations. It contains information and materials these institutions can use to promote machine tool and metals-related occupations, help individuals select and succeed in training for these occupations, and upgrade the skills of individuals currently working in these occupations.

The section on Career Development provides information on establishing and operating career development centers that help students plan and prepare for careers in the machining and machine tool industries.

The Career Action Plans section contains a series of career action plans outlining the methods and procedures for developing a career path in the machine tool and metals-related industries for three types of individuals: high school students, displaced workers, and employed individuals who want to prepare themselves for better career opportunities in the future.

The Career Orientation Modules are a six-week or 180-hour self-paced introduction to the basic hand tools, practices and equipment used in the machine tool and metal-working occupations. The modules are best used with the guidance of an instructor and should be accompanied by the MAST video. A sample Internship Agreement is provided as well to be used by schools and companies to establish mutually productive industry internships for students.

The Remediation Courses section includes eight course syllabi (three reading, two English, and three math), researched, validated, and documented by the MAST project, to raise students’ skills and knowledge to the level necessary to start and succeed in college.

The eleven General Education Courses (four English, three math, one physics, and three psychology) that were researched, validated, and documented by MAST Development Centers as well, should be offered in conjunction with the technical courses in the machine tool and metals-related occupations.

Finally, the MAST Remote Site/Industrial Training Model provides guidelines for using the MAST technical curricula as a base in preparing customized training for industry customers to update the skills of current employees.
CAREER DEVELOPMENT

Today, individuals are limited only by their imagination. Everyone wants to succeed, but most still hold to the traditional view that the only path to success is through a 4 year degree. Parents, in particular, believe that this is the best option available for their children. The facts, however, show that skilled technicians actually enter the workforce at a higher rate of pay than the average 4 year college graduate.

Times have changed. The American dream has not changed, but the way to achieve it has. The ladder to success has turned into a speedway for technology. Like a high-powered machine, technology is accelerating at such a fast pace many are left behind. In a world full of ex-bankers, brokers and business majors; skilled educated technicians are competing very well indeed.

Career Development for this new world includes preparation for employment and industrial contact. Outside the formal structure of educational institutions, students need the ability to connect with the real world when addressing the issues of career development. Today’s job seeker must not only be well trained in a particular career field, he/she must also be well equipped with the polished techniques of knowing how to land the ultimate job.

As the nation recognizes and responds to the need for newer and more effective methods of training and upgrading skills, individuals who acquire those skills will also require assistance in securing employment. A Career Development Center should address job placement services to help reduce the time frame of unemployment or underemployment. While employers are expecting skills, in addition to formal degrees, colleges must expand their services to meet the demands of the work place through continuing education, training centers and contract education with industry. Targeted groups include not only the traditional student; placement services will also need to include those who are returning to be retrained. Moreover, placement centers must offer targeted assistance for a growing group of special populations, such as the disabled, single parents, dislocated workers, whose needs offer new challenges for placement departments. Ideally, Career Development Centers should serve as a one-stop shop for those needing and seeking comprehensive career educational and job training information.

CAREER DEVELOPMENT CENTER

Success in a global economy must start in the schools. Students must be prepared to tackle the challenges that technology brings to them. But educators must be willing to keep up with modern technological advances. Staying up-to-date with industry, however, is not the school’s only challenge. In today’s environment, a technical or community college must go beyond the normal placement business. Job placement is but one aspect of what a college’s Career Development Center must accomplish for it’s students. The student’s file should be managed from the point of his initial inquiry to well after his employment for follow on assessment to monitor and adjust curriculum to fit not only current industry requirements, but future trends as well. A Career Development Center really needs to take a “Life Cycle” approach.
Career development is an infinite process. It encompasses life's experiences to include influences that serve as a guide in directing one to a particular career field. One's personality, skills, talents, interests, environment and social life all play a part in career development. It focuses on the culmination of life's experiences when addressing career choices. It is also a fluid process; as society changes, so does an individual's interests, as technology continues to shape the current and future job market.

A Career Development Center serves as a facilitation organization to help students reach their career goals by offering career advisement, support activities and employment assistance and employment follow-up and assessment. The center should basically assist students in planning, preparation and placement (Figure D-1).

**CAREER DEVELOPMENT CENTER**

![Figure D-1](image)

**PLANNING**

Planning involves a process whereby, based upon one's unique personal inventory (skills, interest and aptitude), individuals can make intelligent educational and career choices. Career development planning should encompass personal, social, educational and career goals.
The planning process is infinite in structure and must undergo periodic review. Career Development Centers should aid students in identifying personal capabilities, values, needs, and the impact they have on career choices. Centers assist in paralleling an individual’s makeup with a specific occupational field. It also helps students fine-tune career and lifelong goals based upon an understanding of oneself and the real world, resulting in individualized career plans. Moreover, these influential processes should be a joint effort between counselors, faculty, family, friends, industry representatives and alumni, expanding upon experiences such as formal/informal education, career exploration, job shadowing, and internships or apprenticeships.

PREPARATION

To effectively prepare clients in meeting their needs, the center should address several basic goals:

- Provide a library of up-to-date career information;
- Aid clients in researching career fields which match their individual interest, aptitude, etc.;
- Provide services such as achievement testing, aptitude testing, career interest inventories, computerized career exploration, etc. to better determine career possibilities;
- Support career-related educational instruction in coordination with faculty; and
- Establish the framework for parents and industry representatives to share in career goals.

Information provided by centers should include:

- Occupational data for civilian and military careers that address training requirements, job duties, placement statistics, job outlook, advancement and labor market information;
- Training data related to universities, community colleges, vocational-technical institutions, apprenticeships and on-the-job training;
- Information to assist in making career choices, such as survey evaluations and tests of individual’s interests and aptitudes;
- Local/state/federal test preparation material concerning educational and career choices;
- Career exploration and job seeking information relative to employment applications, resumes, cover letters, interviewing techniques, etc.; and
- Information related to scholarships, financial assistance, admissions assistance.

PLACEMENT

One of the primary purposes of a Job Development Center is to focus on employment opportunities for students and graduates. The mission includes not only career assistance while one is attaining his/her educational goals, but also career placement once the individual has completed his/her education.
Job placement services should (1) provide resources and job search strategies that enable students to achieve their goals, (2) serve as a communication channel between instructors, counselors and placement staff, (3) establish and market relationships between industry/business to secure co-op, internship and employment opportunities, (4) coordinate employment prospects for graduates and (5) organize career information and opportunities.

The ability to secure employment is of paramount importance to society. Trends indicate that post secondary institutions are being challenged reference placement accountability. With recruitment and retention becoming major issues concerning institutions, a student’s college choice is determined not only by career interest, but also by placement statistics and salary analysis, which are valuable services provided by career centers. Data concerning the types of jobs graduates are securing, numbers of students being placed, whether individuals are employed in related fields of study and average starting salaries all contribute to educational and career decisions. Overall, the functions of job placement services should address pre-employment preparation, job development, career placement and follow-up/follow-through.

PRE-EMPLOYMENT PREPARATION

Pre-Employment preparation is the process by which one obtains the necessary skills to secure and keep employment in their chosen field. Preparation includes techniques involved in the job search, accurately completing employment applications, customized resumes and polished interviewing tactics. When mastered, these techniques should remain with the individual for a lifetime, as job turnover and competition for specific jobs continue to increase.

The job placement center is in the unique position to offer the skills that are necessary for the transition from school or unemployment to work. The center may offer workshops, seminars and individual sessions for students. Also, integration of resume writing/interviewing techniques may be incorporated within classes, with the cooperation of faculty and placement center staff. Ideally, a credit or non-credit career course may be added to an institution’s curriculum.

Pre-employment preparation should address:
- Pre-Employment instruction and counseling:
  - Plan of action for job hunting
  - Obtaining employment information
- Career objectives:
  - Targeting type of job desired, advancement, employment outlook
- Job search process:
  - Sources and location of employment
  - Placement assistance within the college, other organizations and identification of key individuals
  - Employer preference concerning skills, attitudes, etc.
  - Job referrals
- Resume preparation
- Completion of job applications
- Interviewing skills and techniques:
- Proper dress/grooming
- Questions asked by the employer
- Questions asked by the interviewee

Employability skills:
- Teamwork orientation
- Computer literacy
- Proper workplace readiness skills
- Good work ethic
- Positive attitude
- Punctuality
- Desire to do the right job
- Common courtesy
- Social skills

Data concerning employment trends and job specifics:
- Marketing one's credentials with employer needs
- Listing of employers who have hired prior graduates
- Institution placement reports concerning employment, entry-level salaries, etc.

Correspondence to employers:
- Cover letters
- Follow-up letters, thank you's after the interview
- Letters of acceptance/rejection concerning job offers

Federal/state/local legislation concerning employment

JOB DEVELOPMENT

Job development is the process of locating and/or creating potential employment prospects for individuals. This includes identifying qualified candidates and matching their skills to business/industry, tapping into new and emerging opportunities within career fields and being on the cutting edge of developing new occupations that were previously non-existent. Although graduate employment cannot be guaranteed by institutions, sufficient potential employers should be developed in each career field. As verification of educational effectiveness remains a primary issue, a joint effort between business/industry and placement centers must exist, as verification of educational effectiveness remains a primary issue. Since college customers include not only the student, but also the hiring entity, job development functions must address the need to locate potential employers for students and to locate qualified persons for the business sector. Job development is a two-way street; job centers must establish an on-going, mutually beneficial relationship with the business sector in order for students to have ample employment options. Community networking and an active advisory council that includes representatives from education, business, industry, trade associations, community leaders and technical instructors contribute to effective job development.

Job development includes determining students' employment needs and building correlated employer files. The types of educational courses offered at the institution serves as the basis of job development, and student employment needs will determine the types of employment
opportunities available. An employer list should identify organizations that are possible employers for qualified students. The result would be a potential match of individual skills/needs of students to that of skills/needs of employers. Job analysis involves the assessment of an employer’s needs in determining the proper placement of graduates. Both job analysis and job development go hand-in-hand. Effective job analysis results in the creation of jobs that previously did not exist and successfully identifying sources of employers.

Sources of potential employers include:
- Personal referrals/networking
- Former students
- Current students who are working
- Instructors/staff
- Advisory councils
- Chambers of Commerce
- Employment commissions
- Rehabilitation commissions
- Civil services agencies
- Newspaper advertisements
- Telephone directories
- Employer directories
- Community service organizations
- Public libraries

Placement centers usually contact employers by mail/survey, telephone or personal visitation in order to secure various employment opportunities. Serving as the campus liaison between students and employers, the methods used in advertising the college and candidates to potential employers could include:
- Association newsletter articles
- Radio and television advertising
- Newspaper and magazine advertising
- Professional association coverage
- Business staff meeting presentations
- Resume books
- Resume briefs
- Trade show booths
- Student reunions
- Business/industrial on-site visits
- Business career days/targeted job fairs
- In-house campus interviews

**JOB PLACEMENT**

Job placement is not a one-person task. The art of preparing an individual for placement requires the services and commitment of instructors, counselors, administrators and support staff to ensure students are properly trained and placed. Traditionally, most institutions rely on one central office
to bear the responsibility for finding employment for graduates. However, the nature of the college and the fields of study or technologies offered may allow deviance from the traditional central placement office concept. For example, due to the diversity and intensity of technical curricula, a technical/vocational college may offer placement assistance within each individual technology. As programs require constant revision, due to the nature of technology, a department chair or instructor may be charged with the responsibility of placement. In terms of streamlining, this method may be more effective and specific; industry can negotiate directly with each department, and the end result would be more one-on-one, specialized attention to the needs of both the student and employer. In essence, departments that are responsible for the recruitment, education and placement of students remain more in touch when referencing accountability and effectiveness.

Nevertheless, a coordinated effort between a placement center and a program must exist in order for students to be prepared to enter the job market. The placement service is a support system of pre-employment information, resume preparation, job search and interviewing skills that are necessary for one to find employment with the least amount of expended time and effort.

To assist personnel in job placement, a center should address:

- Supporting and placing individuals in internships, cooperative education programs, community contact programs (community clubs/organizations willing to offer career planning assistance) and part-time, on/off-campus employment programs;
- Maintaining a student placement file referencing his/her skills, goals, personality, salary requirements, geographic preference and work history;
- Administering student pre-employment interviews to review the student's qualifications, occupational objective, type of job desired, resume and interview preparation;
- Maintaining a record-keeping system to effectively match position requirements to student's qualifications;
- Developing a system of job information distribution, unique to the needs of each institution (on-line campus data systems, bulletin boards, job binders, etc.);
- Directing individuals to various job openings (mail outs to graduates, resume/candidate screening, etc.); and
- Administering follow-up activities to students and employers after job referrals.

FOLLOW-UP

Institutional effectiveness and accountability are of paramount importance to any organization. A properly orchestrated follow-up system provides information that can be used in the evaluation of departments and in the documentation of data for future planning. Analysis of survey data can pinpoint individuals who are employed/unemployed and those who may need additional training. Follow-up information can also serve as a baseline in the evaluation of support services, educational departments, existing curricula and the development of new training programs.

Methods of capturing effective follow-up information include:

- Graduate surveys (Figure E-1)
• Non-completer surveys (Figure F-1)
• Employer surveys (Figure G-1)

GRADUATE SURVEYS

A graduate survey, either by mail or phone, is an excellent method of obtaining feedback from alumni concerning how effectively an institution prepared them to enter the workforce. Data captured would incorporate employment status, employing company, educational and support service effectiveness and recommendations for improvements. Moreover, placement statistics concerning each department can be compiled to document program performance, in addition to being a useful tool in marketing/recruitment and in meeting local/state/federal governmental standards. Factors such as those employed in a related/non-related field, those who entered the military or continued their education, those who are seeking employment or are unavailable for employment can be documented in a summary report that is unique to the institution and elaborated upon when referencing corresponding detail reports. Moreover, as institutions strive for a higher degree of accountability and improved methods of student tracking, several states have experimented with pilot projects such as aggregate data sharing between state employment commissions and state educational entities in an effort to further document educational/employment outcomes of students.

Nevertheless, frequency and intensity of follow-up surveys will depend upon an institution’s own needs, personnel and resources. Initial, 180-day, one-year and long-term follow-ups should yield information such as:
• Former student’s correct address and phone number
• Employer’s name, address and job title
• Employment in a related/non-related field
• Entry-level salary, promotions, benefits
• How the student found a job
• Mobility patterns
• Opinions concerning the total educational experience
• Opinions on career readiness
• Additional education received
• Identification of possible new openings within an organization

NON-COMPLETER SURVEYS

Many institutions conduct surveys of all students who do not officially complete a program. With retention being a major concern, these non-completer surveys help document reasons for one’s departure from college and aid in identifying problem areas within the campus.
EMPLOYER SURVEYS

The employer survey is an effective instrument to use when organizations wish to document an employer’s satisfaction with an individual and the degree of training he/she received while enrolled in college. As a public relations tool, it may also reinforce channels of communication when targeting new employment opportunities within the company. This survey should highlight:

- Quality of work
- Quantity of work
- Educational/technical training
- Personal skills
- Work preparation in relation to those who did not receive formal training
- Hiring source
- Suggestions for improvement in college curricula
- Future job openings, dates for hiring, etc.

As a whole, follow-up information addresses former students’ needs and skills, in addition to capturing employer’s and ex-student’s evaluation of curricula and the institution. The end result is a higher number of better-prepared individuals entering the workforce.

FOLLOW-THROUGH

Follow-through defines a process of effectively utilizing the follow-up survey data in attaining the institution’s placement and training missions. It involves thorough review and reporting of survey information to the appropriate departments in order for change to be successfully implemented. Moreover, data shared with administration, faculty, staff and advisory committees assist in the efficient documentation and facilitation for continued improvement.

As institutional effectiveness and accountability become primary issues, the Job Development Center is in the unique position of providing services in support of the total educational experience when focusing on issues such as recruitment, retention, placement, and follow-up.
GRADUATION FOLLOW-UP

We periodically conduct surveys of employers to help us evaluate the courses we offer and to advise us on other courses and programs which are needed. If we may contact your immediate supervisor so he or she can have the opportunity to participate in such a survey, please supply the information below.

Supervisor's Name: ____________________________
Supervisor's Job Title: __________________________

If you have completed courses in your MAJOR FIELD OF STUDY, please rate them according to how well they fulfilled your educational needs. Students with undeclared/undeclared majors should skip to next question.

Very Good Good Average Poor Very Poor
a. Quality of instruction
b. Grading/Testing
c. Instructor interest
d. Content of course(s)
e. Instructional media
f. Class size

If you have used any of the college services below, please rate them according to how well they fulfilled your individual needs.

Very Good Good Average Poor Very Poor
a. Financial aids
b. Counseling
c. Job placement services
d. Course advisement
e. Tutoring services
f. Veterans services
g. Learning lab/packages
h. Student activities
i. Library services

If you have enrolled in another college since your enrollment at our college, please answer the following:

On your current (or most recently attended) college:
Name of College: ____________________________
City and State: ____________________________
Your Current Major Field of Study: ____________________________

Did you have problems transferring to the college indicated above
□ No □ Yes;
What?
□ Transferring credit hours
□ Transcript problems
□ Admissions problems
□ Other (describe): ____________________________

How many credit hours earned at our college were not accepted at the college indicated above?
□ All credit hours accepted
□ 1st 1 - 3 credit hours
□ Lost 4 - 6 credit hours
□ Lost 7 - 12 credit hours
□ Lost 13 - 21 credit hours
□ Lost more than 21 credit hours

Please complete other side of form

Figure E-1

19
If you are currently enrolled in college, please indicate your current status and classification at the college:

STATUS
☐ Part-time student (less than 12 hours) ☐ Junior
☐ Full-time student (12 or more hours) ☐ Senior
☐ Other

CLASSIFICATION
☐ Graduate student

How well did the courses you completed at our college prepare you for continuing your education?

☐ My preparation was excellent
☐ My preparation was satisfactory
☐ Good in some areas only
☐ Fair, but all areas could have been better
☐ My preparation was inadequate

How would you rate the training you received at our college in relation to its usefulness to you in performing your job?

☐ Very good
☐ Good
☐ Average
☐ Poor
☐ Very poor

Please check below if the course(s) you took at our college helped you in your occupational area in any of the following ways:

☐ Helped to obtain job
☐ Helped performance on present job
☐ Helped advance on present job
☐ None of the above
☐ Other (describe)

Were you employed in your occupational area PRIOR to enrolling in the course(s) completed at our college?

☐ Yes ☐ No

How would you rate the availability of jobs in your occupational area?

☐ Very good
☐ Good
☐ Average
☐ Poor
☐ Very poor

If your occupational area is NOT related to the courses you have completed at our college, please check each reason which applies. If occupational area is related to courses completed, skip to the next question.

☐ Transferred to a four-year college
☐ Not sufficiently qualified for a job in my field of college preparation
☐ Preferred to work in another field
☐ Found better paying job in another field
☐ Could not find a job in field of preparation
☐ Worked previously in field of preparation, but changed
☐ Other (describe)

How do you see the course(s) completed at our college in terms of your career plans?

☐ Of immediate, direct benefit
☐ Of long term, direct benefit
☐ Of indirect benefit
☐ Of no benefit

Are you interested in taking other courses at our college? You may include courses not presently offered by our college.

☐ No
☐ Yes, what course(s)?

We would appreciate any comments regarding how we could improve the course(s) you have completed and/or services we have provided. Please use the space below for your comments. If you need additional space, please attach another sheet.

Signature __________________________

Date __________________________

BELOW SPACE RESERVED FOR COMMENTS

PLEASE COMPLETE OTHER SIDE OF FORM
PROJECT FOLLOW-UP

What was your PRIMARY objective in attending our two-year college?

☐ Improvement of existing job skills
☐ Preparation for job to be obtained
☐ University transfer credit
☐ Personal interest
☐ Other (describe)

To what extent has this objective been completed?

☐ Fully completed
☐ Partially completed
☐ Not completed

Do you plan to pursue this objective further?

☐ No
☐ Yes; where?
  ☐ At our college
  ☐ At another college
  ☐ Other (describe)

How much education is (or was) required to accomplish your educational objective at our college?

☐ Selected course(s)
☐ Certificate program
☐ Two-year associate degree program
☐ Other (describe)

What was your principal reason for NOT re-enrolling at our college this term?

☐ Completed needed courses
☐ Transportation problems
☐ Transferred to another college
☐ Found job in occupation related to course(s) completed at this college
☐ Unfulfilling job hours
☐ Financial reasons
☐ Change of residence
☐ Grade problems
☐ Dissatisfied with instruction
☐ Dissatisfied with content of courses
☐ Personal/family illness or injury
☐ Other personal/family reasons
☐ Other (describe)

Do you currently have a college degree or certificate?

☐ No
☐ Yes; where?
  ☐ Certificate
  ☐ Associate Degree
  ☐ Bachelor's
  ☐ Master's
  ☐ Doctorate
  ☐ Other
  Degree or Certificate Field of Study

Are you interested in taking other courses at our college? You may include courses not presently offered by our college.

☐ No
☐ Yes; what course(s)

What is your current educational status? (check one)

☐ Currently attending school
☐ Not currently attending school

Please check all of the following that apply:

☐ Continuing education
☐ Unemployed
  ☐ Actively seeking employment
  ☐ Physically unable to accept employment
  ☐ Personal reasons not to accept employment
  ☐ Foreign student returning home
  ☐ Other (please explain)
☐ Employed
  ☐ Employment related to major
  ☐ Employment unrelated to major
  ☐ Military
  ☐ Foreign student returning home

If employed, please complete the following:

Company name: __________________________

Company address: _________________________

Company city, state, & zip: ________________

Company Phone Number: _________________

Salary: $_________ hourly/ hours worked per week
or $_________ monthly/or $_________ yearly

Job Title: _________________________________

Date Began Employment: __________________

Job Duties: __________________________________

We periodically conduct surveys of employers to help us evaluate the courses we offer and to advise us on other courses and programs which are needed. If we may contact your immediate supervisor to hear or she can have the opportunity to participate in such a survey, please supply the information below.

Supervisor's Name: ________________________

Supervisor's Job Title: _____________________

PLEASE COMPLETE OTHER SIDE OF FORM

Figure F-1
Please check below if the course(s) you took at our college helped you in your occupational area in any of the following ways.

- Helped to obtain job
- Helped performance on present job
- Helped advance on present job
- None of the above
- Other (describe)

How would you rate the training you received at our college in relation to its usefulness to you in performing your job?

- Very good
- Good
- Average
- Poor
- Very poor

Would you recommend the course(s) taken at our college to others employed in positions similar to yours?

- No
- Undecided
- Yes

Were you employed in your occupational area PRIOR to enrolling in the course(s) completed at our college?

- No
- Yes

We would appreciate any comments regarding how we could improve the course(s) you have completed and/or services we have provided.

Please use the space below for your comments.

Thank you.
IDENTIFICATION:
JOB TITLE:
PROGRAM MAJOR:

Is the job title and status of this individual accurate?
☐ Yes  ☐ No, if NO, please describe change(s) below.

What is your relationship with this individual?
☐ Employer
☐ Supervisor
☐ Personnel Staff
☐ Co-worker
☐ Other (describe)

Please rate the training received by this individual in the following personal skill areas. Please respond only to those areas you feel are appropriate.

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Very Good</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Accepting责任</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Punctuality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Personal initiative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Willingness to learn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Co-worker cooperation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Management cooperation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Work attendance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Work Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Personal appearance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. Compliance with policies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please rate the training received by this individual in the following technical skill areas. Please respond only to those areas you feel are applicable to the occupational area.

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Very Good</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Mathematical Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Technical knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Organizational ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Communication skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What is your overall rating of the training received by this individual as it relates to the requirements of his or her job?
☐ Very good
☐ Good
☐ Average
☐ Poor
☐ Very poor

What, in your opinion, is the job outlook for program employees of this particular occupational field?

Present
Future
☐ Very good  ☐
☐ Good       ☐
☐ Average    ☐
☐ Poor       ☐
☐ Very Poor  ☐

As a result of this person's training, how would you rate his or her preparation in relation to other employees in his or her working group who did not receive such training?
☐ No basis for comparison
☐ Individual is better prepared
☐ Both are about the same
☐ Individual is less prepared

To what extent, if any, has this individual's training added to his or her ability for job placement and advancement?
☐ Very much
☐ Much
☐ Average
☐ Very little
☐ None

What was the primary source(s) for the initial hiring of this individual?
☐ Employment agency
☐ College faculty member
☐ College job placement office
☐ Mutual acquaintance
☐ Applicant applied on own initiative
☐ Other (describe)
What suggestions do you have for improving the technical and/or personal skills of future employees?

What, in your opinion, are additional areas of training (job titles, skills, etc.) in which our school should become involved?
REFERENCES


CAREER ACTION PLANS

OVERVIEW

A career action plan serves as a road map that outlines the methods and procedures one might follow in developing a career path in a particular area. It incorporates one’s total personal interest and aptitude, and includes external factors which influence decisions in a specific career field. It acts as a program guide to connect the world of work and life after high school. It serves as a checkpoint of one’s progress in determining the requirements needed for entry into a chosen field. The MAST model serves as a personal plan of action for securing a job in the machine tool and metals-related trades.

Recruitment of qualified workers and the preparation of these workers are of paramount importance within the precision manufacturing industry.

The narratives and charts in this section provide “concept documentation” to colleges as they seek to provide guidance to persons who are attempting to identify and to prepare for career opportunities. Career Action Plans specifically addresses three groups of individuals.

- high school students seeking career guidance and training;
- displaced workers needing to be re-trained for future employment; and
- individuals who are employed but see a need to prepare themselves for better career opportunities in the future.

HIGH SCHOOL STUDENTS

A career action plan for high school students is at Figure A-1. The following discussion concerning the preparation of an individual career action plan at the high school level is outlined in that chart.

Traditionally, a student’s formal career objective begins to materialize during high school. His/her career decision can be influenced by:

- Student’s personal master file/profile
- Aptitude
- Interest
- Achievement tests
- Career information provided by high school counselor
- Parental involvement and support
- Design of educational program
- Master schedule maintained by high school counselor

Student’s goals are further solidified by a career opportunities center (or whatever the local forum may be called) offered at high school. Various informational sources also include:

- Career information from industries
- Job demand from Job Services Information Network
- Internet career opportunities

1 26
HIGH SCHOOL STUDENTS

PREPARATION OF CAREER ACTION PLAN AT HIGH SCHOOL LEVEL
Individual's Master File, Aptitudes, Interests and Achievement Tests, Career Information Provided by Counselor, Parental Involvement and Support, Design of Education Program and School Schedule submitted by Counselor

CAREER OPPORTUNITIES CENTER AT HIGH SCHOOL
A. Job Information from Industries
B. Job Demand from Job Service Information Networks
C. Planning for Educational Requirements
D. Planning for Educational Opportunities
E. Counseling in Areas of Concern
F. Counseling of Students in Transition
G. Counseling of Students in Transition
H. Counseling of Students in Transition
I. Counseling of Students in Transition
J. Counseling of Students in Transition
K. Counseling of Students in Transition
L. Counseling of Students in Transition
M. Counseling of Students in Transition
N. Counseling of Students in Transition
O. Counseling of Students in Transition
P. Counseling of Students in Transition
Q. Counseling of Students in Transition
R. Counseling of Students in Transition
S. Counseling of Students in Transition
T. Counseling of Students in Transition
U. Counseling of Students in Transition
V. Counseling of Students in Transition
W. Counseling of Students in Transition
X. Counseling of Students in Transition
Y. Counseling of Students in Transition
Z. Counseling of Students in Transition

SELECT CAREER ORIENTATION MODULES
CAREER ENHANCEMENT
TECHNICAL MODULES

MANUFACTURING ENGINEERING TECHNOLOGY
Mechanical
Electrical Discharge Machining
Computer Numerical Application
Welding
Industrial Maintenance Mechanics
Computer Numerical Application
Computer Aided Design
SHEET METAL
Automation Machine Repair/Operator
SOLDERING

CAREER ENHANCEMENT

SKILLS CERTIFICATE
LOCAL INDUSTRIES
(30-40 Days or Part Time as Scheduled
With Industry)
Manufacturing Engineering Technology
Mechanical
Electrical Discharge Machining
Computer Numerical Application
Welding
Industrial Maintenance Mechanics
Sheet Metal
Computer Aided Design
SHEET METAL
Automation Machine Repair/Operator
SOLDERING

TECHNICAL MODULES

PREPARATION OF INDIVIDUAL PORTFOLIO

COLLEGE ENTRANCE EXAM
COLLEGE PLACEMENT TESTING
ACADEMIC SKILLS TESTING

PREPARATION OF ENROLLMENT FOR SELL SERVICE

REMEDIATION AT HIGH SCHOOL
Reading
Writing
Mathematics

REMEDIATION AT POSTSECONDARY INSTITUTION

ENROLL IN COMMUNITY/TECHNICAL COLLEGE

REMEDIATION IN CERTIFICATE OR ASSOCIATE OF APPLIED SCIENCE DEGREE PROGRAM

CAREER OPPORTUNITIES CENTER AT HIGH SCHOOL

CAREER OPPORTUNITIES CENTER AT HIGH SCHOOL

Figure A-1

BEST COPY AVAILABLE
Academic program requirements
Scheduling of career technical modules
Scheduling of tours of business and industry

Of special note is the area of special populations. With precision manufacturing traditionally being a male-dominated field, females, in addition to special populations (economically disadvantaged, educationally disadvantaged, single parent/displaced homemakers, limited English proficiency, disabled and at-risk students) cannot be overlooked. Through various services within the community and institution, support services would address:

- Specific counseling, mentoring and assistance
- Females to receive orientation and support from local women's resource centers
- Special populations to receive appropriate guidance/counseling and financial support to include assistance with food, transportation, shelter, utilities, child care, medicine, etc.:
  - Department of Human Services
  - State Workforce Commission
  - Job Training Partnership Act (tuition, books, etc.)
  - Housing and Urban Development
  - Children Management Services
  - United Way, Goodwill Industries, Salvation Army, etc.
- Disabled to receive orientation from mentors and State Rehabilitation Services
- Drop-outs or at-risk students to receive appropriate mentoring and support from local and state agencies

If a career decision has not been made, the local institution will offer orientation modules (example orientation modules are included at the end of this volume) whereby undecided individuals receive a sampling of the precision manufacturing industry. These orientation modules focus on career enhancement and technical modules. Targeted populations include junior and senior year students. Curricula include basic shop tools/machine practices, basic sheet metal forming and joining practices and remediation in math, science and personal and group communications.

Moreover, specific remediation modules addressing advanced specialty area courses/modules are included in this volume of the MAST deliverables. These occupational specialities include:

- Machining (MAC)
- Manufacturing Engineering Technology (MET)
- Mold Making (MLD)
- Welding (WLD)
- Industrial Maintenance (IMM)
- Sheet Metal (SML) and Composites (COM)
- Tool and Die (TLD)
- Computer-Aided Drafting and Design (CAD)
- Computer-Aided Manufacturing and Advanced CNC (CAM/CNC)
- Instrumentation (INT)
- Laser Machining (LSR)
- Automated Equipment/Computer-Integrated Manufacturing (CIM)
Curricula completion would lead to a skills certificate and further student enlightenment as to the opportunities relative to the machine tool industry. As involvement becomes more intense, interested students may enter on-the-job-training with local industries (30-90 days or part time, as scheduled with industry) with further emphasis on the various occupational specialities, as listed above. The end result would lead to consideration of enrollment in college and/or possible entry-level employment. On-the-job training in the form of early work experiences allow the student to begin to specialize after he has had the opportunity to consider the various specialties with the machine tool industry.

With or without an on-the-job training option, the individual’s personal portfolio (a history of student performance, documenting ones’ progression and achievements in various areas with emphasis upon knowledge, experience and skills) is analyzed to determine the need for academic remediation and/or support service(s). If remediation is necessary, said remediation at the high school level shall address reading, writing, mathematics and English, whereby additional remediation will be contingent upon a student’s pass/fail status. Additional remediation may be necessary early on in college based upon personal need or actual state requirements. For example, the State of Texas requires the completion of a testing instrument called the Texas Academic Skills Program (TASP). Prospective college students must pass the test or take remediation courses in weak areas until they pass, or they cannot continue to pursue a college degree.

Typically, secondary schools provide a direct pathway for most students, offering career information and preparation in basic academic skills. If a high school student’s career decision has been initially made without the need for external guidance, the individual’s personal portfolio is analyzed to determine their need for academic remediation or support service(s). If remediation is necessary, the remediation at the high school level shall address reading, writing, mathematics and English, whereby additional remediation will be contingent upon a student’s pass/fail status. Hopefully that remediation is heavy on technical math.

If the high school portfolio does not reflect a need for academic remediation and/or additional support service(s), they would directly enroll in a community/technical college machining certificate/associate degree program.

UNEMPLOYED, OUT-OF-SCHOOL AND DISPLACED WORKERS

A career action plan flowchart follows as Figure B-1 for unemployed, out-of-school and displaced workers. The following discussion concerning the preparation of a career action plan is outlined in that chart. This plan would be addressed during their initial visits to the college campus.

Once an individual exits high school, they may be classified as unemployed, out-of-school or displaced. Career decisions, at this point, may be influenced by:
• Individual’s personal master file/profile
• Aptitude
• Interest
• Achievement tests
• Career information provided by college counselor
• Design of educational program
• Master schedule maintained by college counselor

Further direction can be attained by investigating a career opportunities center at the local community or technical college. Informational sources include:
• Career information from industries
• Job demand from Job Services Information Network
• Internet career opportunities
• Academic program requirements
• Scheduling of career technical modules
• Scheduling of on-the-job training modules
• Scheduling of tours of business and industry

Females, special populations, disabled and at-risk individuals are of particular interest. With the workforce becoming highly diversified, specific needs of these targeted individuals must be met in order for recruitment of this group to be successful. Support services within the community and institution would provide:
• Specific counseling, mentoring and assistance
• Females to receive orientation and support from local women’s resource centers
• Special populations to receive appropriate guidance/counseling and financial support to include assistance with food, transportation, shelter, utilities, child care, medicine, etc.:
  - Department of Human Services
  - State Workforce Commission
  - Job Training Partnership Act (tuition, books, etc.)
  - Housing and Urban Development
  - Children Management Services
  - United Way, Goodwill Industries, Salvation Army, etc.
• Disabled to receive orientation from mentors and State Rehabilitation Services
• Drop-outs or at-risk individuals to receive appropriate mentoring and support

If a career decision has not been made, the local institution will offer orientation modules (included in this volume) whereby undecided individuals receive an orientation of the machine tool industry. These modules should focus on career enhancement and basic technical information. Targeted populations include those unemployed, out-of-school and displaced workers who are needing additional career guidance.

Advanced specialty area courses/modules at the postsecondary level concerning occupational specialties are available in Volume 3-14 of the MAST deliverables and include:
• Machining (MAC)
• Manufacturing Engineering Technology (MET)
• Mold Making (MLD)
Welding (WLD)
Industrial Maintenance (IMM)
Sheet Metal (SML) and Composites (COM)
Tool and Die (TLD)
Computer-Aided Drafting and Design (CAD)
Computer-Aided Manufacturing and Advanced CNC (CAM/CNC)
Instrumentation (INT)
Laser Machining (LSR)
Automated Equipment/Computer-Integrated Manufacturing (CIM)

Successful completion would lead to a skills certificate and further consideration relative to the opportunities of the machining industry. Moreover, interested persons may enter on-the-job training with local industries (30-90 days or part time, as scheduled with industry) further emphasizing the various occupational specialities, as listed above, which may lead to further specialization and an associate degree.

CURRENTLY EMPLOYED WORKERS UPGRADING JOB SKILLS

A career action plan flowchart follows as Figure C-1 for currently employed workers upgrading job skills. The following discussion concerning the preparation of a career action plan at the college level is keyed to that illustration.

The technological revolution has necessitated the need for individuals and existing workers to be trained in new frontiers that are required for economic survival and growth. Delivery of new technologically up-to-date machines require the operator to be fully trained to take advantage of the capabilities of that new machine. The speeds, feeds and automated cutting and grinding processes available on a new machine, or a set of devices all operated by one man is extraordinary. The cost savings associated with training the operator to handle the new equipment is tremendous. Educational institutions and industry must aid in producing and supporting a more highly skilled employee.

A currently employed individual may be sponsored by his company for on-site training at the shop/plant, or could attend classes on campus either on his own or with company support. A Remote Site/Industrial Training Model is enclosed in this volume to help technical colleges prepare for collaborations and contracts with industries for credit or non-credit training.

Employers increasingly depend on people who can put knowledge to work. The opportunities for an individual with a good, solid technical base to expand can be located by:
Careers in precision manufacturing have traditionally been oriented toward the male population. Females, special populations, disabled and at-risk individuals, with the desire to upgrade their job skills, will find support services to encompass:

- Specific counseling, mentoring and assistance
- Females to receive orientation and support from local women's resource centers
- Special populations to receive appropriate guidance/counseling and financial support to include assistance with food, transportation, shelter, utilities, child care, medicine, etc.:
  - Department of Human Services
  - State Workforce Commission
  - Job Training Partnership Act (tuition, books, etc.)
  - Housing and Urban Development
  - Children Management Services
  - United Way, Goodwill Industries, Salvation Army, etc.
- Disabled to receive orientation from mentors and State Rehabilitation Services
- Drop-outs or at-risk individuals to receive appropriate mentoring and support

Advanced specialty area courses/modules at the postsecondary level concerning occupational specialties are available in Volumes 3-14 of the MAST deliverables and incorporate:

- Machining (MAC)
- Manufacturing Engineering Technology (MET)
- Mold Making (MLD)
- Welding (WLD)
- Industrial Maintenance (IMM)
- Sheet Metal (SML) and Composites (COM)
- Tool and Die (TLD)
- Computer-Aided Drafting and Design (CAD)
- Computer-Aided Manufacturing and Advanced CNC (CAM/CNC)
- Instrumentation (INT)
- Laser Machining (LSR)
- Automated Equipment/Computer-Integrated Manufacturing (CIM)

Individuals desiring additional upgrading may enroll in specific precision manufacturing enhancement courses offered through continuing education classes at the local college and/or industrial site. Interest in this field may lead to entrance into college in a formal industrial technology degree plan and/or possible employment.
CAREER ORIENTATION MODULES

MANUFACTURING TECHNOLOGIES ORIENTATION

180 Hours of Self-Paced Career Orientation Modules for the Precision Manufacturing Occupations
# Table of Contents

Manufacturing Technologies Orientation

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Section A</td>
<td>--- Introduction - 2 hrs.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Unit 1, Shop Safety - 4 hrs.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Unit 2, Mechanical Hardware - 8 hrs.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Unit 3, Reading Drawings - 8 hrs.</td>
<td>5</td>
</tr>
<tr>
<td>Section B</td>
<td>--- Hand Tools - 2 hrs.</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Unit 1, Arbor and Shop Presses - 12 hrs.</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Unit 2, Work-Holding and Hand Tools - 6 hrs.</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Unit 3, Hacksaws - 4 hrs.</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Unit 4, Files - 8 hrs.</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Unit 5, Hand Reamers - 8 hrs.</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Unit 6, Identification and Uses of Taps - 12 hrs.</td>
<td>12</td>
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<tr>
<td></td>
<td>Unit 7, Tapping Procedures - 12 hrs.</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Unit 8, Tread-Cutting Dies and Their Uses - 10 hrs.</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Unit 9, Off-Hand Grinding - 8 hrs.</td>
<td>15</td>
</tr>
<tr>
<td>Section C</td>
<td>--- Dimensional Measurement - 4 hrs.</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Unit 1, Systems of Measurement - 6 hrs.</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Unit 2, Using Steel Rules - 4 hrs.</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Unit 3, Using Vernier, Dial, and Digital Instruments for Direct Measurements</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Unit 4, Using Micrometer Instruments - 8 hrs.</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Unit 5, Using Comparison Measuring Instruments - 8 hrs.</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Unit 6, Using Gage Blocks - 6 hrs.</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Unit 7, Using Angular Measuring Instruments - 8 hrs.</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Unit 8, Tolerances, Fits, Geometric Dimensions, and Statistical Process Control</td>
<td>24</td>
</tr>
<tr>
<td>Section D</td>
<td>--- Materials - 2 hrs.</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Unit 1, Selection and Identification of Steels - 4 hrs.</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Unit 2, Selection and Identification of Nonferrous Metals - 4 hrs.</td>
<td>27</td>
</tr>
</tbody>
</table>

**Total 180 Hours**
Manufacturing Technologies Orientation

Graduating high school seniors are at a crossroads. Most assume that they have two basic options; enter the minimum-wage, service-providing marketplace or enter a four-year college for an engineering or business degree. Few take the time to consider a career as a technician in manufacturing technology.

Most have a picture of a dirty, dark plant doing one monotonous task all day long for their entire lifetime. They would be surprised to learn that the workplace is now clean and well lit with extremely sophisticated machines that require computer literate technicians, not operators, to produce a challenging part that takes a great deal of skill and knowledge. The machine tool industry has a large, documented shortage of these skilled technicians. Properly trained technicians earn more than the average four-year college graduate, and are in demand across the country.

A technician is a vital member of the overall engineering team involved in product design, testing, and manufacturing. The technician is a graduate of an accredited one-year certificate or a two-year associate degree program in a number of fields in the precision manufacturing industry ranging from a laser machinist to a tool and die maker. The technician has been thoroughly grounded in many of the same engineering fundamentals as engineering graduates, but in a more applied manner. Technicians use calculus and technical math, but they quickly see its practical application to the workplace and spend less time on theory.

Many graduating seniors choose not to go to college because they picture themselves being desk bound for life. They want "hands on" challenges. A career as a technician in the precision manufacturing industry provides the challenge, the income, and the opportunities to move up in the business.

This 180-Hour Orientation Module is designed to give the person at their crossroads in life an opportunity to review a career as a manufacturing technician. It is a self-paced, general instruction guide in basic shop tools and machining practices to give the student an opportunity to preview the field within this industry. Although self-paced, secondary schools should appoint a guidance counselor or shop instructor to help administer the program. In addition, the MAST Career Orientation video should also be reviewed prior to the start of this 180-hour module. The module is designed around basic hand tools. No power tools or equipment is required. The program; however, could be modified to enhance the orientation if these are available. We would only add the precaution that a qualified instructor would be necessary if the program includes actual machine cutting, grinding, turning, or joining equipment.

This Basic Shop Tools and Machining Practices course serves as a portion of the MAST deliverables. This course is designed as a career enhancement tool for high school students to be used in a self-paced instructional environment. The course content deals with topics of basic information on shop safety, mechanical hardware, reading drawings and materials used in machine tool practices. This course was developed by MACHINE TOOL ADVANCED SKILLS TECHNOLOGY (MAST) and any opinions, findings, conclusions, or recommendations expressed in this material are those of the MACHINE TOOL ADVANCED SKILLS TECHNOLOGY (MAST) consortium and do not necessarily reflect the views of the U.S. Department of Education.
SECTION A

INTRODUCTION


SUBJECT: Section A --- Introduction

OBJECTIVE: After completing this unit, you should be able to identify the different career opportunities in machining and related areas.

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Section A --- Introduction, page 1-5
2. Identify the professional machining career that would be of interest to you

MATERIALS:

1. Student text

LENGTH: Approximately 2 hours
SECTION A

UNIT 1, SHOP SAFETY


SUBJECT: Section A --- Unit 1, Shop Safety

OBJECTIVES: After completing this unit, you should be able to:
   1. Identify common shop hazards
   2. Identify and use common shop safety equipment

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 1, Shop Safety, page 5-13
2. Complete the Self-Test on page 13 with 100% accuracy
3. Successfully pass the Post Test on Unit 1, Shop Safety

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 4 hours
SECTION A
UNIT 2, MECHANICAL HARDWARE


SUBJECT: Section A --- Unit 2, Mechanical Hardware

OBJECTIVES: After completing this unit, you should be able to:
1. Identify treads and threaded fasteners
2. Identify tread nomenclature on drawings
3. Discuss standard series of threads
4. Identify and describe applications of common mechanical hardware found in the machine shop

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 2, Mechanical Hardware, page 14-27
2. Complete the Self-Test on page 27 with 100% accuracy
3. Successfully pass the Post Test on Unit 2, Introduction to Mechanical Hardware

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 8 hours
SECTION A
UNIT 3, READING DRAWINGS


SUBJECT: Section A --- Unit 3, Reading Drawings

OBJECTIVE: After completing this unit, you should be able to:
1. Read and interpret common detail drawings found in the machine shop

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 3, Reading Drawings, page 28-36
2. Complete the Self-Test on page 36 with 100% accuracy
3. Successfully pass the Post Test on Unit 3, Reading Shop Drawings

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 8 hours
SECTION B
HAND TOOLS


SUBJECT: Section B --- Hand Tools

OBJECTIVE: After completing this unit, you should be able to:
1. Understand the importance of hand tools and their purpose

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Section B --- Hand Tools, page 37-38
2. Understand the importance of hand tool safety

MATERIALS:
1. Paper
2. Pencil #2 or pen
3. Student text

LENGTH: Approximately 2 hours
SECTION B

UNIT 1, ARBOR AND SHOP PRESSES


SUBJECT: Section B --- Unit 1, Arbor and Shop Presses

OBJECTIVES: After completing this unit, you should be able to:
1. Install and remove a bronze bushing using an arbor press
2. Press on and remove a ball bearing from a shaft on an arbor press using the correct tools
3. Press on and remove a ball bearing from a housing using an arbor press and correct tooling
4. Install and remove a mandrel using an arbor press
5. Install and remove a shaft with key in a hub using the arbor press

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 1, Arbor and Shop Presses, page 38-45
2. Complete the Self-Test on page 45 with 100% accuracy
3. Successfully pass the Post Test on Unit 1, Arbor and Shop Presses

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 12 hours
Machine Tool Advanced Skills
Technology Program (MAST)

SECTION B

UNIT 2, WORK-HOLDING AND HAND TOOLS


SUBJECT:  Section B --- Unit 2, Work-Holding and Hand Tools

OBJECTIVES:  After completing this unit, you should be able to:
1. Identify various types of vises, their uses, and maintenance
2. Identify the proper tool for given job
3. Determine the correct use of a selected tool

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 2, Work-Holding and Hand Tools, page 46-55
2. Complete the Self-Test on page 54 and 55 with 100% accuracy
3. Successfully pass the Post Test on Unit 2, Noncutting Hand Tools

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH:  Approximately 6 hours
SECTION B

UNIT 3, HACKSAWS


SUBJECT: Section B --- Unit 3, Hacksaws

OBJECTIVES: After completing this unit, you should be able to:
1. Identify, select, and use hand hacksaws

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 3, Hacksaws, page 55-58
2. Complete the Self-Test on page 57 and 58 with 100% accuracy
3. Successfully pass the Post Test on Unit 3, Hacksaws

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 4 hours
SECTION B

UNIT 4, FILES


SUBJECT: Section B --- Unit 4, Files

OBJECTIVES: After completing this unit, you should be able to:
1. Identify eight common files and some of their uses

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 4, Files, page 58-64
2. Complete the Self-Test on page 64 with 100% accuracy
3. Successfully pass the Post Test on Unit 4, Files and Off-Hand Grinding

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 8 hours
SECTION B
UNIT 5, HAND REAMERS


SUBJECT: Section B --- Unit 5, Hand Reamers

OBJECTIVES: After completing this unit, you should be able to:
1. Identify at least five types of hand reamers
2. Hand ream a hole to a specified size

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 5, Hand Reamers, page 64-68
2. Complete the Self-Test on page 68 with 100% accuracy
3. Successfully pass the Post Test on Unit 5, Hand Reamers

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 8 hours
SECTION B

UNIT 6, IDENTIFICATION AND USES OF TAPS


SUBJECT: Section B --- Unit 6, Identification and Uses of Taps

OBJECTIVES: After completing this unit, you should be able to:
1. Identify common taps
2. Select taps for specific applications

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 6, Identification and Uses of Taps, page 68-74
2. Complete the Self-Test on page 73 and 74 with 100% accuracy
3. Successfully pass the Post Test on Unit 6, Taps, Identification and Application

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 12 hours
SECTION B
UNIT 7, TAPPING PROCEDURES


SUBJECT: Section B --- Unit 7, Tapping Procedures

OBJECTIVES: After completing this unit, you should be able to:
1. Select the correct tap drill for a specific percentage of thread
2. Determine the cutting speed for a given work material --- tool combination
3. Select the correct cutting fluid for tapping
4. Tap holes by hand or with a drill press
5. Identify and correct common tapping problems

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 7, Tapping Procedures, page 74-79
2. Complete the Self-Test on page 79 with 100% accuracy
3. Successfully pass the Post Test on Unit 7, Tapping Procedures

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 12 hours
SECTION B

UNIT 8, THREAD-CUTTING DIES AND THEIR USES


SUBJECT: Section B --- Unit 8, Thread-Cutting Dies and Their Uses

OBJECTIVES: After completing this unit, you should be able to:
1. Identify dies used for hand threading
2. Select and prepare a rod for threading
3. Cut threads with a die

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 8, Tread-Cutting Dies and Their Uses, page 80-84
2. Complete the Self-Test on page 83 and 84 with 100% accuracy
3. Successfully pass the Post Test on Unit 8, Tread-Cutting Dies and Their Uses

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 10 hours
SECTION B

UNIT 9, OFF-HAND GRINDING


SUBJECT: Section B --- Unit 9, Off-Hand Grinding

OBJECTIVES: After completing this unit, you should be able to:
1. Describe setup, use, and safety of the pedestal grinder

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 9, Off-Hand Grinding, page 84-88
2. Complete the Self-Test on page 88 with 100% accuracy
3. Successfully pass the Post Test on Unit 9, Off-Hand Grinding

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 8 hours
SECTION C

DIMENSIONAL MEASUREMENT


SUBJECT: Section C --- Dimensional Measurement

OBJECTIVES: After completing this unit, you should be able to:
1. Define measurement
2. Identify some of the measurement needs of the Machinist
3. Define metrology
4. Define accuracy
5. Define precision
6. Define reliability
7. What does discrimination refer to
8. Define calibration
9. Know what the common expression "the measurement is right on" means
10. Identify ten measuring instruments that are available to a machinist

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Section C, Dimensional Measurement, page 89-107

MATERIALS:

1. Paper
2. Pencil #2 or pen
3. Student text

LENGTH: Approximately 4 hours
SECTION C

UNIT 1, SYSTEMS OF MEASUREMENT


SUBJECT: Section C --- Unit 1, Systems of Measurement

OBJECTIVES: After completing this unit, you should be able to:
1. Identify common methods of measurement conversion
2. Convert inch dimensions to metric equivalents and convert metric dimensions to inch equivalents

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 1, Systems of Measurement, page 108-112
2. Complete the Self-Test on page 112 with 100% accuracy
3. Successfully pass the Post Test on Unit 1, Systems of Measurement

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 6 hours
SECTION C

UNIT 2, USING STEEL RULES


SUBJECT: Section C --- Unit 2, Using Steel Rules

OBJECTIVES: After completing this unit, you should be able to:
1. Identify various kinds of rules and their applications
2. Apply rules in typical machine shop measurements

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 2, Using Steel Rules, page 113-121
2. Complete the Self-Test on page 121 with 100% accuracy
3. Successfully pass the Post Test on Unit 2, Using Steel Rules

MATERIALS:
1. Paper
2. Pencil #2 or pen
3. Rule Measuring Kit

LENGTH: Approximately 4 hours
SECTION C

UNIT 3, USING VERNIER, DIAL, AND DIGITAL INSTRUMENTS FOR DIRECT MEASUREMENTS


SUBJECT: Section C --- Unit 3, Using Vernier, Dial, and Digital Instruments for Direct Measurements

OBJECTIVES: After completing this unit, you should be able to:
1. Measure and record dimensions to an accuracy of plus or minus .001 in. with a vernier caliper
2. Measure and record dimensions to an accuracy of plus or minus .02 mm using a metric vernier caliper
3. Measure and record dimensions using a vernier depth gage.

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 3, Using Vernier, Dial, and Digital Instruments for Direct Measurements, page 122-133
2. Complete the Self-Test on page 129 with 100% accuracy
3. Successfully pass the Post Test on Unit 3, Using Vernier Dial and Digital Instruments

MATERIALS:
1. Paper
2. Pencil #2 or pen
3. Inch Vernier Caliper Measuring Test Kit
4. Metric Vernier Caliper Measuring Test Kit
5. Inch Vernier Depth Gage Measuring Test Kit

LENGTH: Approximately 12 hours
SECTION C

UNIT 4, USING MICROMETER INSTRUMENTS

TEXTS:  

SUBJECT:  
Section C --- Unit 4, Using Micrometer Instruments

OBJECTIVES:  
After completing this unit, with the use of appropriate measuring kits, you should be able to:
1. Measure and record dimensions using outside micrometers to an accuracy of plus or minus .001 of an inch.
2. Measure and record diameters to an accuracy of plus or minus .001 of an inch.
3. Measure and record depth measurements using a depth micrometer to an accuracy of plus or minus .001 inch.
4. Measure and record dimensions using a metric micrometer to an accuracy of plus or minus .01 mm.
5. Measure and record dimensions using a vernier micrometer to an accuracy of plus or minus .0001 in. (assuming proper measuring conditions).

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 4, Using Micrometer Instruments, page 133-156.
2. Complete the Self-Test on page 145, 147, 151, and 156 with 100% accuracy.
3. Successfully pass the Post Test on Unit 4, Using Micrometer Instruments.

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH:  Approximately 8 hours.
SECTION C

UNIT 5, USING COMPARISON MEASURING INSTRUMENTS


SUBJECT: Section C --- Unit 5, Using Comparison Measuring Instruments

OBJECTIVES: After completing this unit, you should be able to:
1. Define comparison measurement
2. Identify common comparison measuring tools
3. Given a measuring situation, select the proper comparison tool for the measuring requirement

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 5, Using Comparison Measuring Instruments, page 157-178
2. Complete the Self-Test on page 178 with 100% accuracy
3. Successfully pass the Post Test on Unit 5, Using Comparison Measuring Instruments

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 8 hours
SECTION C

UNIT 6, USING GAGE BLOCKS

TEXTS: 

SUBJECT: 
Section C --- Unit 6, Using Gage Blocks

OBJECTIVES: 
After completing this unit, you should be able to:
1. Describe the care required to maintain gage block accuracy
2. Wring gage blocks together correctly
3. Disassemble gage block combinations and properly prepare the blocks for storage
4. Calculate combinations of gage block stacks with and without wear blocks
5. Describe gage blocks applications

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 6, Using Gage Blocks, page 178-187
2. Complete the Self-Test on page 187 with 100% accuracy
3. Successfully pass the Post Test on Unit 5, Using Gage Blocks

MATERIALS:
1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 6 hours
SECTION C

UNIT 7, USING ANGULAR MEASURING INSTRUMENTS


SUBJECT: Section C --- Unit 7, Using Angular Measuring Instruments

OBJECTIVES: After completing this unit, you should be able to:
1. Identify common angular measuring tools
2. Read and record angular measurements using a vernier protractor
3. Calculate sine bar elevations and measure angles using a sine bar and adjustable parallels
4. Calculate sine bar elevations and establish angles using a sine bar and gage blocks

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 7, Using Angular Measuring Instruments, page 187-195
2. Complete the Self-Test on page 195 with 100% accuracy

MATERIALS:
1. Paper
2. Pencil #2 or pen
3. Student text

LENGTH: Approximately 8 hours
SECTION C

UNIT 8, TOLERANCES, FITS, GEOMETRIC DIMENSIONS, AND STATISTICAL PROCESS CONTROL (SPC)


SUBJECT: Section C --- Unit 8, Tolerances, Fits, Geometric Dimensions, and Statistical Process Control (SPC)

OBJECTIVES: After completing this unit, you should be able to:
1. Describe basic reasons for tolerance specifications
2. Recognize common geometric dimensions and tolerances
3. Describe the reasons for press fits and know where to find press fit allowance information
4. Describe in general terms the purpose of SPC

IN ORDER TO COMPLETE THIS UNIT YOU MUST:
1. Read Unit 8, Tolerances, Fits, Geometric Dimensions, and Statistical Process Control (SPC), page 196-204
2. Complete the Self-Test on page 205 with 100% accuracy

MATERIALS:
1. Paper
2. Pencil #2 or pen
3. Student text

LENGTH: Approximately 10 hours
SECTION D
MATERIALS


SUBJECT: Section D --- Materials

OBJECTIVES: After completing this unit, you should be able to:
1. Identify the raw materials used in making iron and steel
2. What are the two safety rules in lifting
3. How is hot metal identified
4. Why do you never look toward arc welding

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Section D, Materials, page 205-208

MATERIALS:

1. Paper
2. Pencil #2 or pen
3. Student text

LENGTH: Approximately 2 hours
SECTION D

UNIT 1, SELECTION AND IDENTIFICATION OF STEELS


SUBJECT: Section D --- Unit 1, Selection and Identification of Steels

OBJECTIVES: After completing this unit, you should be able to:
1. Identify different types of metals by various means of shop testing

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 1, Selection and Identification of Steels, page 208-215
2. Complete the Self-Test on page 214 and 215 with 100% accuracy
3. Successfully pass the Post Test on Unit 1, Selection and Identification of Steels

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 4 hours
SECTION D
UNIT 2, SELECTION AND IDENTIFICATION OF NONFERROUS METALS


SUBJECT: Section D --- Unit 2, Selection and Identification of Nonferrous Metals

OBJECTIVES: After completing this unit, you should be able to:
1. Identify and classify nonferrous metals by a numerical system
2. List the general appearance and use of various nonferrous metals

IN ORDER TO COMPLETE THIS UNIT YOU MUST:

1. Read Unit 2, Selection and Identification of Nonferrous Metals, page 215-222
2. Complete the Self-Test on page 221 and 222 with 100% accuracy
3. Successfully pass the Post Test on Unit 2, Selection and Identification of Nonferrous Metals

MATERIALS:

1. Paper
2. Pencil #2 or pen

LENGTH: Approximately 4 hours
EXAMPLE

INTERNSHIP AGREEMENT

Between

Enter College Name and The Enter Corporation Name

Whereas, Enter College Name, hereinafter referred to as the "COLLEGE", and the ENTER NAME OF CORPORATION, hereinafter referred to as the "CORPORATION", desiring to identify the terms and respective responsibilities of the two institutions entering into mutual participation of training ENTER PROGRAM TITLE students do hereby mutually agree to the following terms and conditions:

I. TERM AND TERMINATION:

This Agreement shall become effective when approved by the COLLEGE and CORPORATION Presidents. If approved, the Agreement shall continue in effect for a period of one (1) year after the date of execution by the COLLEGE and the CORPORATION. Either party may terminate this Agreement without cause by giving written notice of such party's intention to the COLLEGE President (on behalf of the COLLEGE) or to the CORPORATION Chief Executive Officer or CORPORATION President (on behalf of the CORPORATION), no less than fifteen (15) days prior to the date of the proposed termination. In the event the agreement is terminated, however, all students registered or enrolled in the Internship at the time of the notice shall have the opportunity to complete without interruption their respective programs or cycles. This agreement may be renewed on an annual basis by the COLLEGE President. This agreement shall bind and benefit the respective parties and their legal successors, but shall not otherwise be assignable in whole or in part, by either party without first obtaining written consent of the other party.

II. DEFAULT:

If either party shall default in this Agreement by breaching any of the covenants herein contained, the party not in default may give notice specifying the default and, if such default has not been corrected within ten (10) days, the party giving such notice may, at its option, immediately terminate this Agreement.

III. NOTICE:

All notices, demands, requests and other communications required hereunder shall be in writing and shall be deemed to have been given when personally delivered or when deposited in a regularly maintained receptacle of the United States Postal Service, postage prepaid or certified, return receipt requested, properly addressed to:

COLLEGE: Name of College President
President
Enter College Name
Street Address
City, State, Zip Code

CORPORATION: Name of Corporation President or CEO
Title
Company Name
Street Address
City, State, Zip Code

or at other such address as either party shall designate in writing to the other.
IV. GOVERNMENTAL IMMUNITY FROM TORT CLAIMS:

It is understood that the COLLEGE and CORPORATION, as a political subdivision of the State of ________, is protected from liability against TORT claims, except that Enter College Name does not purchase general liability insurance for litigation or potential claims against it or the CORPORATION.

V. INDEMNIFICATION:

COLLEGE and CORPORATION each agree, to the extent authorized under the Constitution and the laws of the State of _______, to indemnify and hold the other harmless from any claim, demand, suit, or loss of liability which the indemnified party may sustain as a result of the indemnifying party's breach of its duties or the indemnifying party's errors or omissions within the terms of this Agreement; provided, however, that neither party shall have any obligation or liability under this paragraph for claims, demands or causes of action arising out of the intentional or grossly negligent conduct (whether sole, joint, concurring or otherwise) of the other party, its officers, employees, agents, licensees, or invitees, or for the intentional or grossly negligent conduct of any person or entity not subject to such party's supervision or control. This indemnification shall include reasonable expenses, including attorney's fees incurred in defending such claims, and damages incurred by reason of the indemnifying, or for damages caused by the indemnifying party. As a condition precedent to asserting a right of indemnity, the party seeking indemnification shall have given the indemnifying party timely written notice of the assertion of the claim as to which the right of indemnification is claimed to exist.

VI. INSTRUCTIONAL PLANNING:

Students registered and matriculated in the COLLEGE's Associate of Applied Science ENTER PROGRAM TITLE curriculum, as designated and agreed on by the COLLEGE Program Coordinator and the Chief Executive Officer of the CORPORATION or his designee, may utilize the various departments of the CORPORATION for augmented training experience during the hours planned jointly by the Program Coordinator of the COLLEGE and the Chief Executive Officer of the CORPORATION or designee.

VII. COLLEGE RESPONSIBILITIES:

A. To develop student schedules with the CORPORATION Designee prior to entry of the student and to forward copies of each student schedule to the CORPORATION Designee.

B. To require Students and College Faculty to abide by and conform to existing rules and regulations of the CORPORATION including dress requirements and proper identification badges while in the CORPORATION.

C. To appoint a COLLEGE staff member designated as the ENTER PROGRAM TITLE Program Coordinator Designee to work with the CORPORATION Designee in developing student schedules and to act as a liaison between the COLLEGE and the CORPORATION.

D. To provide the CORPORATION Designee with "Student Evaluation Forms" prior to the completion of the Student Internship.

E. To provide appropriate orientation for all ENTER PROGRAM TITLE students prior to the starting date including assigned site location, supervisor names, hours of assignment, starting and completion dates, and attendance policy.
F. The COLLEGE may withdraw any Student from the Internship on the basis of ill health, unsatisfactory performance, or violation of the COLLEGE Rules and Regulations.

G. To meet with the CORPORATION Designee and Student on a regular basis during the Internship for the purpose of assessing student progress. The College’s ENTER PROGRAM TITLE Program Coordinator shall maintain a written record of individual student progress and completed Student Evaluation Form.

H. To administer a written and practical laboratory safety examination to all students enrolling in ENTER PROGRAM TITLE Internship and to prohibit any student from entering into the internship who does not perform satisfactorily and demonstrate satisfactory knowledge of laboratory safety procedures.

I. The COLLEGE seeks to provide equal educational opportunities without regard to race, color, religion, national origin, sex, age, or handicap. This policy extends to employment, admissions, and all programs and activities supported by the COLLEGE.

J. To require each student to sign the CORPORATION’s Proprietary Information and Inventions and Noncompetition Agreement.

K. To require each student to supply the CORPORATION with a release, in form satisfactory to the CORPORATION, regarding the student's insurance coverage and release of liability.

VII. CORPORATION RESPONSIBILITIES:

A. To identify a CORPORATION Designee who shall be responsible for daily student intern assignments.

B. To require the CORPORATION Designee to prepare a written evaluation of the student's performance and achievement upon completion of the internship. The evaluation forms shall be provided by the COLLEGE.

C. To make emergency telephone calls for treatment of injuries received by student interns during the Internship hours at the expense on the student intern.

D. To report, in writing, to the COLLEGE Program Coordinator the names of any student interns that may been exposed to any hazardous materials as defined by OSHA and the nature of the exposure at the time of the probable exposure.

E. To provide adequate laboratory and conference space as may be available.

F. To provide student interns the use of instructional materials including consumable supplies as may be used in demonstration or practica at no cost to the COLLEGE or to the student.

G. To provide practical experience, participation, training, and observation of procedures and protocols in ENTER PROGRAM TITLE.

H. To provide professional instruction and supervision at all times for each student during the duration of the internship.

I. The CORPORATION reserves the right to suspend any ENTER PROGRAM TITLE student determined unsatisfactory because of violation of Corporate Policy Rules and Regulations and upon review by CORPORATION and COLLEGE Coordinators the
Student may be terminated immediately from the Internship by either party if given five (5) working days written notice.

J. The CORPORATION is not required to pay compensation to any student while enrolled in the Internship. Compensation is a Corporate decision. However, the CORPORATION may choose to provide a stipend to student interns during the internship.

IX. MUTUAL RESPONSIBILITIES:

A. The COLLEGE Program Coordinator and CORPORATION Designee shall be responsible for the implementation of this agreement.

B. This contractual agreement shall be reviewed by both the CORPORATION and the COLLEGE annually and shall automatically renew unless either party desires to terminate the agreement and gives the other party fifteen (15) days written notice prior to the termination date.

C. A written modification of this agreement may be made by written request of either party with sixty (60) days advanced notification, if such modification is signed by authorized representatives of all parties to this agreement.

COMPLIANCE WITH APPLICABLE LAW:

This Agreement is subject to all State and Federal laws, ordinances, regulations, and other requirements of each governmental entity having jurisdiction as to the business of the party or the subject matter of this agreement. Venue for any cause of action arising under this agreement shall be in ENTER CITY, COUNTY, STATE.

This agreement, along with Appendices A, B, and C, constitutes the entire agreement of the parties with respect to the subject matter hereof, and supersedes all other proposals or prior agreements, oral or written, and all other communications, oral or written. This agreement may be amended by a written agreement signed by the authorized representatives of each party and duly authorized for execution by the COLLEGE President and CORPORATION President.

IN WITNESS WHEREOF, the parties have executed this agreement in duplicate originals on this date ______________, 199__.

Approval Signatures:

ENTER COLLEGE NAME

ENTER CORPORATION NAME

Name of COLLEGE President
COLLEGE

Name of CORPORATION CEO or President
Title
Corporation

Approval Signatures:

Name
Program Coordinator
Program Title

Name of Corp. Designee
Title
Corporation
APPENDIX A: DEFINITIONS

The COLLEGE and the CORPORATION agree that the following words and terms shall have the following meanings:

1. ACADEMIC YEAR

The months of each year in which the COLLEGE offers educational program and wished to provide this Internship Agreement as part of such program.

2. AGREEMENT

This agreement between COLLEGE and ENTER NAME OF CORPORATION for ENTER PROGRAM TITLE instruction of students at the CORPORATION and any renewals, amendments or addenda thereto, as may be adopted from time to time as hereinafter provided.

3. ENTER NAME OF PROGRAM COORDINATOR

The Faculty member of the COLLEGE who has been assigned the responsibilities and duties to oversee the ENTER PROGRAM TITLE Curriculum.

4. COLLEGE

COLLEGE with the ENTER PROGRAM TITLE Curriculum based at COLLEGE entering into this agreement.

5. CORPORATION

ENTER COMPANY TITLE entering into this agreement with the COLLEGE.

6. STUDENT

Candidates for an Associate of Applied Science Degree in ENTER PROGRAM TITLE at the COLLEGE.

7. TERM

The agreement period provided for under this agreement and any renewals or addenda hereto.

8. STIPEND

A fixed or regular payment or allowance.
COLLEGE agrees as follows:

1. To assign students during CORPORATION normal shift hours.

2. To require students to abide by any dress requirements and wear proper identification badges while in the CORPORATION if required or requested.

3. To require all students enrolled in the Internship to purchase professional liability insurance coverage for the minimum amount of $1,000,000 per occurrence and $3,000,000 annual aggregate with said liability coverage to be in effect throughout the entire internship period. COLLEGE shall provide the CORPORATION with a certificate of insurance and any amendments for each year this contract is in effect when the CORPORATION requests such in writing.

4. To share evaluation data derived from all aspects of this internship with the CORPORATION designee.

5. To require each student to complete an "Internship Evaluation Form" and "Supervisor Evaluation Form" at the completion of the internship and to submit them to the ENTER PROGRAM TITLE Coordinator or Designee.

6. To exercise confidentiality with regard to projects of the CORPORATION to the extent permitted by law.

7. To review individual Student Performance Evaluations and determine individual Student Final Grades. This shall be the responsibility of the COLLEGE ENTER PROGRAM TITLE Coordinator or Designee.

8. COLLEGE agrees to hold the CORPORATION harmless for any reason for termination of the agreement between the COLLEGE and the CORPORATION.
APPENDIX C

CORPORATION agrees as follows:

1. To coordinate with the COLLEGE the maximum number of Student Interns permitted to be assigned to the CORPORATION per rotation.

2. To evaluate, in writing, the assigned student intern's performance using the form provided by the COLLEGE.

3. To provide the student intern with copies of policies and safety manuals on the initial day of the internship and orientation to the workplace.

4. To provide a CORPORATION designee to work with the COLLEGE designee as a liaison between the CORPORATION and the COLLEGE.

5. To provide practical experience, participation, training, and observation of procedures, protocols and applications throughout the assigned internship.

6. To keep confidential from persons not parties to this contract all records pertaining to students to the extent permitted by law.
REMEDIATION COURSES

Today’s young people need new and higher level skills to function effectively in contemporary society. These skills not only include the three R’s—reading, writing and arithmetic—but also include higher order thinking skills, problem-solving skills, the ability to integrate and apply knowledge, and to work cooperatively with others.

Many secondary schools across the nation address these skills; some even integrate practical workplace applications to reinforce the learning process. Nearly all offer remediation of some sort in the junior and senior years, and most states have an entry level testing requirement for state supported colleges and universities, either prior to entry, or at least after a certain number of minimum course hours. The MAST Career Action Plans address these remediation processes.

Although some new students arrive with all the skills and knowledge necessary to start college, many still lack a basic platform upon which to build. This section includes that remediation designed for community and technical colleges.

Today’s jobs can no longer be filled with individuals who possess only technical skills. With greater demands on the shop floor (computer control, smart machines, team management, and greater emphasis on quality), the worker of today must possess greater communication, reading, writing, and mathematic skills than his counterpart 10 to 20 years ago.

MAST has identified a tremendous void between where workers “need to be” and where entry-level young people “really are.” To become part of the solution to this ever-growing problem, MAST project staffs have worked with industry and faculty (secondary and postsecondary) to develop this collection of remediation courses. Many courses have been pilot tested and have proven to raise the basic reading, writing and communication skills of the students who have taken these courses.

MAST realizes that a student who enrolls in and passes these courses will certainly not have all of the skills required for successful employment. However, they will have placed themselves in a position to continue to grow and learn for years in the future.

These courses are intended to be used for simply “taking up the slack” in what students have learned in the past and what they need to survive in today’s workplace.

Each of these courses includes “SCANS” activities which have been identified by the Secretary’s Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor. The Secretary’s Commission has identified in its “AMERICA 2000 REPORT” that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities needed for solid job performance.

Our goal, in presenting these remediation courses, is that they may be used as a resource for training and equipping a better, smarter workforce.
## REMEDIATION COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>READING</td>
<td>Adult Literacy Program</td>
<td>3</td>
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<tr>
<td>READING</td>
<td>College Preparatory Reading I</td>
<td>3</td>
</tr>
<tr>
<td>READING</td>
<td>College Preparatory Reading II</td>
<td>3</td>
</tr>
<tr>
<td>ENGLISH</td>
<td>Writing Skills I</td>
<td>2</td>
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<tr>
<td>ENGLISH</td>
<td>Writing Skills II</td>
<td>3</td>
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<td>MATH</td>
<td>Basic Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH</td>
<td>Beginning Algebra I</td>
<td>3</td>
</tr>
<tr>
<td>MATH</td>
<td>Beginning Algebra II</td>
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</tbody>
</table>
MAST PROGRAM
COURSE SYLLABUS
ADULT LITERACY PROGRAM

Lecture hours/week: 1
Lab hours/week: 6
Credit hours: 3

COURSE DESCRIPTION:

A comprehensive language arts literacy program for adults with significant reading difficulties and dyslexic characteristics. Emphasis is on decoding, comprehension, and structure of the written language. Additional components include cursive writing, spelling, and written expression.

PREREQUISITES: Entry is by placement and/or diagnostic testing instruments or by referral of the counseling staff.

REQUIRED COURSE MATERIALS:

Recommended
Textbook: Texas Scottish Rite Hospital Literacy Program (Dallas, Texas), Educators Publishing Services, Inc., Cambridge, Massachusetts.
  Workbook 1 Lessons 1-25
  Workbook 2 Lessons 26-60
  Workbook 3 Lessons 61-100
  Workbook 4 Lessons 101-160

Supplies: Linkage Paper (81/2" x 14"), 35 sheets per pad
  Student kit (includes alphabet letters, colored cubes, and pencil grips)

COURSE OBJECTIVES:

The student will:
- decode written language through word attack skills by using phonological awareness, structural analysis, and contextual clues;
- determine word origins and word history through the use of a dictionary;
- identify the main idea and supporting details;
- sequence events correctly;
- identify and perceive cause and effect relationships;
- evaluate and make critical analysis of given information;
- infer and draw logical conclusions;
- make generalizations;
- predict future events and outcomes;
- follow written directions involving subordinate steps;
- use parts of a book;
- use reading aids;
- use graphic sources;
- use standard reference books;
apply the correct formation of letters in cursive writing; and
express thoughts in writing.

LECTURE (CONTENT)

This course contains 160 videotape lessons with students responding to the lessons as instructed by the therapist on the tape. The attending teacher has a leadership/supervisory role and is responsible for program sequencing, record keeping, and maintaining an environment that is conducive to learning.

Total Lecture Hours 12

LABORATORY (CONTENT)

Students are scheduled for six hours of laboratory instruction each week throughout the quarter semester.

Daily Lesson Plans: (Lessons 1-100)
- Alphabet and Sound System
- New Learning (Work Attack)
- Reading
- Handwriting (Lesson 1-50)
- Spelling
- Review
- Listening Comprehension

Daily Lesson Plans: (Lessons 101-135)
- Dictionary and Reference Skills
- New Learning
- Reading
- Spelling (high frequency and learned words)
- Review
- Reading Comprehension

Daily Lesson Plans: (Lessons 136-160)
- Closure and Practice
- Reading
- Spelling with Writing
- Spelling with common words
- Writing
- Review
- Reading Comprehension

Total Lab Hours 72
COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. Resources: Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks on time
      2. requests appropriate sequential video tapes and materials as required
      3. provides self-evaluation of progress through student workbooks
   B. Interpersonal: Works with others
      1. works with diversity through interaction with class members of varied ethnic, religious, and social backgrounds
   C. Information: Acquires and uses information
      1. completes assignments in workbooks and evaluates individual performance
      2. completes sequential workbook assignments
      3. interprets workbook assignments and communicates through individual and group participation

II. FOUNDATION SKILLS
   A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
      1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
         a. reads and interprets appropriate level material within a self-paced program
         b. interprets reading assignments
         c. interprets graphical information
      2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
         a. completes required reading assignments
         b. takes class notes
      3. Listening: Receives, attends to, interprets, and responds to verbal messages and other cues
         a. responds to verbal messages
         b. confirms verbal message interpretations with instructor and peers
         c. makes appropriate behavior responses to verbal messages
         d. participates in discussion and identification of the difference between listening and hearing
4. **Speaking**: Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organizes ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required skill

**B. Thinking Skills**: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking**: Generates new ideas
   a. participates in the "brain-storming" process
   b. participates in group problem solving process
   c. practices the team approach to problem solving

2. **Decision Making**: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. identifies actions required to accomplish personal goals

3. **Problem Solving**: Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility

4. **Seeing Things In the Mind's Eye**: Organizes and processes symbols, pictures, graphs, objects, and other information
   a. interprets non-verbal communication in the classroom

**C. Personal Qualities**: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility**: Exerts a high level of effort and perseveres towards goal attainment
   a. attends class and completes daily course requirements

2. **Self-Esteem**: Believes in own self-worth and maintains a positive view of self
   a. instructor provides positive reinforcement and feedback permitting a positive projection of self

3. **Sociability**: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. develops effective communication across cultures
   b. interacts with peers and listens effectively and provides constructive criticism

4. **Self-Management**: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. monitors/assesses personal goal progress

5. **Integrity/Honesty**: Chooses ethical courses of action
   a. meets specific criteria standards to successfully complete the course
   b. encouraged to accept ethical and honest courses of action set by example
COURSE SYLLABUS

COLLEGE PREPARATORY READING I (REMEDICATION)
COURSE SYLLABUS

COLLEGE PREPARATORY READING I

Lecture hours/week: 2  Lab hours/week: 3  Credit hours: 3

COURSE DESCRIPTION:

An introductory course designed to prepare students to meet entry-level requirements for certificate and associate degree programs. Course objectives emphasize skill development and/or refinement in literal, interpretive, and evaluative comprehension; vocabulary; reading rate; and application of study skills to reading assignments. Independent lab study reinforces the lecture component.

PREREQUISITES:

Entry is by placement and/or diagnostic testing instruments, completion of the Adult Literacy Program, or by referral of the counseling staff.

REQUIRED COURSE MATERIALS:


Supplies:  Standard lined notebook paper  
  # 2 pencils  
  one package of scantrons

COURSE OBJECTIVES:

VOCABULARY:
The student will demonstrate the ability to:
  > use context clues to determine the meaning of a word with multiple meanings;
  > use context clues within a paragraph or longer unit of writing to determine the meaning of an unfamiliar word; and
  > use context within a paragraph or longer unit of writing to determine the meaning of a figurative expression.

COMPREHENSION:
The student will demonstrate the ability to:
  > identify the topic of a paragraph or longer unit of writing;
  > identify the stated main idea of a paragraph or longer unit of writing;
  > identify a summary of the stated main idea within a paragraph or longer unit of writing; and
recognize ideas that support, exemplify, or expound the main idea in a paragraph or longer unit of writing.

AUTHOR'S INTENT:
The student will demonstrate the ability to:

- recognize the author's purpose for writing;
- evaluate the relevance of written material for a specific purpose or audience;
- evaluate the context, word choice, and phrasing in a reading selection to determine the opinions and attitudes of an author;
- identify a summary of the intended meaning of a section of material in a reading selection; and
- recognize the intended emotional effect that an author's choice or use of words has on the reader.

ORGANIZATION OF IDEAS:
The student will demonstrate the ability to:

- determine the purpose of a definition and example organizational pattern in a reading selection;
- identify transitional words/phrases in defining or explaining a specialized term, phrase, or idea in a reading selection;
- determine the purpose of a time order organizational pattern in a reading selection;
- identify transitional words/phrases in determining time order in a reading selection;
- determine the sequence of steps in technical, scientific, and research-related material;
- determine the purpose of a spatial order organizational pattern in a reading selection;
- identify transition words/phrases in determining spatial order in a reading selection;
- determine the purpose of an order of importance organizational pattern in a reading selection;
- identify transition words/phrases in determining order of importance in a reading selection;
- determine the purpose of a comparison organizational pattern in a reading selection;
- identify transition words/phrases in determining the similarities in two or more ideas, events, or things in a reading selection;
- determine the purpose of a contrast organizational pattern in a reading selection;
- identify transition words/phrases in analyzing relationships between ideas in opposition in a reading selection;
- determine the purpose of a simple listing organizational pattern in a reading selection;
- identify transition words/phrases in determining a simple listing pattern in a reading selection;
- determine the purpose of cause-effect organizational pattern in a reading selection;
- identify transition words/phrases in determining a cause-effect relationship in a reading selection;
- determine the purpose of a classification organizational pattern in a reading selection;
- identify transition words/phrases in grouping or categorizing people or things according to an established criteria in a reading selection;
- determine the purpose of a problem-solution organizational pattern in a reading selection;
- identify transition words/phrases in recognizing a problem and solution pattern in a reading selection;
- determine the purpose of summarization organizational pattern in a reading selection;
identify transition words/phrases in condensing information to its principle parts in a reading selection.

CRITICAL REASONING:
The student will demonstrate the ability to:
- recognize stated or implied assumptions in evaluating the validity of an author’s argument in a reading selection;
- evaluate the relevance of details, illustrations, and graphic data to an author’s argument in a reading selection;
- judge the strength of a writer’s argument in a reading selection;
- recognize and evaluate the validity of analogies in a reading selection;
- differentiate between fact and opinion in a reading selection;
- determine the objectivity and credibility of a writer or source in a reading selection;
- draw a logical conclusion based on stated or implied information within a reading selection.

STUDY SKILLS:
The student will demonstrate the ability to:
- organize lecture notes, textbook information, and supplementary material for study purposes;
- apply specific test-taking strategies in a testing environment;
- follow written instructions in technical, scientific, and general academic material;
- interpret information that is presented in charts, graphs, or tables;
- apply rules, methods, concepts, principles, laws, or theories from a reading selection to a new situation.

READING RATE:
The student will demonstrate the ability to:
- increase reading speed while comprehending what is read.

LECTURE OUTLINE (CONTENT)

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<tr>
<td>Course Wrap-Up</td>
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</table>

Total Lecture Hours 24
LABORATORY OUTLINE (CONTENT)

The laboratory component supplements lecture by providing additional skills development related to the course objectives. Eight (8) weekly lab application activities are assigned for homework.

Total Lab Hours 36

COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. **Resources:** Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks on time
      2. prepares individual time-plan
      3. provides a self-evaluation of performance based on the time and quality of work
      4. identifies individual strengths and weaknesses through self-reflection
   B. **Interpersonal:** Works with others
      1. participates in group discussions and projects. Works cooperatively with others and contributes to the group process with ideas and suggestions
      2. provides feedback to peers and instructors
      3. works with diversity through interaction of class members of varied ethnic, gender, religious, and social backgrounds
   C. **Information:** Acquires and uses information
      1. completes assignments in textbook and evaluates individual performance
      2. judges the validity of reading assignments
      3. maintains a folder with class notes and related handouts
      4. draws conclusions and makes inferences from reading assignments and verbally communicates to classmates
      5. selects appropriate software and uses computers to complete tutorial assignments

II. FOUNDATION SKILLS
   A. **Basic Skills:** Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
      1. **Reading:** Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
a. reads and studies textbook and reading assignments
b. interprets reading assignments
c. locates and interprets written information including graphs, charts and periodical articles
d. interprets class schedule

2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
a. completes written assignments
b. takes class notes
c. applies reading skills in a writing situation

3. Listening: Receives, attends to, interprets, and responds to verbal messages and other cues
a. receives/interprets lecture material
b. responds to verbal messages
c. confirms verbal message interpretations with instructor and peers, both in and out of class
d. makes appropriate behavior responses to verbal messages
e. participates in discussion and identification of the difference between listening and hearing

4. Speaking: Organizes ideas and communicates orally
a. participates in classroom discussions
b. organizes ideas and communicates specific questions to the instructor
c. verbally affirms understanding of a concept, procedure, or required skill

B. Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. Creative Thinking: Generates new ideas
a. develops new ideas for approaching problem solving
b. participates in the "brain-storming" process
c. participates in group problem solving process
d. practices the team approach to problem solving

2. Decision Making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
a. identifies personal goals
b. identifies actions required to accomplish personal goals

3. Problem Solving: Recognizes problems and devises and implements plan of action
a. makes daily accommodations to stay on schedule
b. seeks additional instruction/clarification for assignment completion
c. balances social and academic life/responsibilities
d. accepts responsibility

4. Seeing Things In the Mind's Eye: Organizes and processes symbols, pictures, graphs, objects, and other information
a. interprets graphical data
b. interprets non-verbal communication in the classroom
5. **Knowing How to Learn**: Uses efficient learning techniques to acquire and apply new knowledge and skills
   a. completes and interprets learning style inventory
   b. utilizes techniques for creative thinking
   c. develops strategies for effective problem solving approaches

6. **Reasoning**: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. performs self-analysis of effective learning style
   b. selects appropriate communication form (oral vs. written)

C. **Personal Qualities**: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility**: Exerts a high level of effort and perseveres towards goal attainment
   a. develops stress management techniques that facilitate and encourage achievement of academic and personal goals
   b. accepts responsibility for effective written and oral communication

2. **Self-Esteem**: Believes in own self-worth and maintains a positive view of self
   a. develops interpersonal skills permitting a positive projection of self
   b. participates in classroom discussions about self-esteem

3. **Sociability**: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. develops effective communication across cultures
   b. interacts with peers, listens effectively, and provides constructive criticism
   c. learns to distinguish between sympathy and empathy

4. **Self-Management**: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. monitors/assesses personal goal progress

5. **Integrity/Honesty**: Chooses ethical courses of action
   a. meets specific criteria standards to successfully complete the course
   b. encouraged to accept ethical and honest courses of action set by example
   c. provide situations and group activities for students to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills Technology Program

MAST

COURSE SYLLABUS

COLLEGE PREPARATORY READING II (REMEDICATION)
MAST PROGRAM
COURSE SYLLABUS
COLLEGE PREPARATORY READING II

Lecture hours/week: 2  Lab hours/week: 3  Credit hours: 3

COURSE DESCRIPTION:

An intermediate course designed to prepare students to meet entry-level requirements for certificate and associate degree programs. Course objectives emphasize skill development and/or refinement in literal, interpretive, and evaluative comprehension; vocabulary; reading rate; and application of study skills to reading assignments. Independent lab study reinforces the lecture component.

PREREQUISITES: Entry is by placement and/or diagnostic testing instruments, completion of College Preparatory Reading I, or by referral of the counseling staff.

REQUIRED COURSE MATERIALS:


Supplies: Standard lined notebook paper
          #2 pencils
          one package of scantrons

COURSE OBJECTIVES:

VOCABULARY:
The student will demonstrate the ability to:
  ▶ use context clues to determine the meaning of a word with multiple meanings;
  ▶ use context clues within a paragraph or longer unit of writing to determine the meaning of an unfamiliar word;
  ▶ use the context within a paragraph or longer unit of writing to determine the meaning of a figurative expression.

COMPREHENSION:
The student will demonstrate the ability to:
  ▶ identify the topic of a paragraph or longer unit of writing;
  ▶ identify the stated main idea of a paragraph or longer unit of writing;
  ▶ identify a summary of the unstated main idea within a paragraph or longer unit of writing;
recognize ideas that support, exemplify, or expound the main idea in a paragraph or longer unit of writing.

AUTHOR'S INTENT:
The student will demonstrate the ability to:
- recognize an author's purpose for writing;
- evaluate the relevance of written material for a specific purpose or audience;
- evaluate the content, word choice, and phrasing in a reading selection to determine the opinions and attitudes of an author;
- identify a summary of the intended meaning of a section of material in a reading selection;
- recognize the intended emotional effect that an author's choice or use of words has on the reader.

ORGANIZATION OF IDEAS:
The student will demonstrate the ability to:
- determine the purpose of a definition and example organizational pattern in a reading selection;
- identify transition words/phrases in defining or explaining a specialized term, phrase, or idea in a reading selection;
- determine the purpose of a time order organizational pattern in a reading selection;
- identify transition words/phrases in determining time order in a reading selection;
- determine the purpose of a spatial order organizational pattern in a reading selection;
- identify transition words/phrases in determining spatial order in a reading selection;
- determine the purpose of an order of importance organizational pattern in a reading selection;
- identify transition words/phrases in determining order of importance in a reading selection;
- determine the purpose of a comparison organizational pattern in a reading selection;
- identify transition words/phrases in determining the similarities in two or more ideas, events, or things in a reading selection;
- determine the purpose of a contrast organizational pattern in a reading selection;
- identify transition words/phrases in analyzing relationships between ideas in opposition in a reading selection;
- determine the purpose of a simple listing organizational pattern in a reading selection;
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- determine the purpose of a cause-effect organizational pattern in a reading selection;
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- determine the purpose of a classification organizational pattern in a reading selection;
- identify transition words/phrases in grouping or categorizing people or things according to an established criteria in a reading selection;
- determine the purpose of a problem-solution organizational pattern in a reading selection;
- identify transition words/phrases in recognizing a problem and solution pattern in a reading selection;
- determine the purpose of a summarization organizational pattern in a reading selection;
- identify transition words/phrases in condensing information to its principle parts in a reading selection.
CRITICAL REASONING:
The student will demonstrate the ability to:
- recognize stated or implied assumptions in evaluating the validity of an author’s argument in a reading selection;
- evaluate the relevance of details, illustrations, and graphic data to an author’s argument in a reading selection;
- judge the strength of a writer’s argument in a reading selection;
- recognize and evaluate the validity of analogies in a reading selection;
- differentiate between fact and opinion in a reading selection;
- determine the objectivity and credibility of a writer or source in a reading selection;
- draw a logical conclusion based on stated or implied information within a reading selection.

STUDY SKILLS:
The student will demonstrate the ability to:
- organize lecture notes, textbook information, and supplementary material for study purposes;
- apply specific test-taking strategies in a testing environment;
- follow written instructions in technical, scientific, and general academic material;
- interpret information that is presented in charts, graphs, or tables;
- apply rules, methods, concepts, principles, laws, or theories from a reading selection to a new situation.

READING RATE:
The student will demonstrate the ability to:
- increase reading speed while comprehending what is read.

LECTURE OUTLINE (CONTENT)

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Total Lecture Hours 24
LAB OUTLINE (CONTENT)

The laboratory component supplements lecture by providing additional skills development related to the course objectives. Eight (8) weekly lab application activities are assigned for homework.

Total Lab Hours 36

COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES

A. Resources: Identifies, organizes, plans, and allocates resources
   1. follows a schedule to complete assigned tasks on time
   2. prepares individual time-plan
   3. provides a self-evaluation of performance based on the time and quality of work
   4. identifies individual strengths and weaknesses through self-reflection

B. Interpersonal: Works with others
   1. participates in group discussions and projects; works cooperatively with others and contributes to the group process with ideas and suggestions
   2. provides feedback to peers and instructors
   3. works with diversity through interaction of class members of varied ethnic, gender, religious, and social backgrounds

C. Information: Acquires and uses information
   1. completes assignments in textbook and evaluates individual performance
   2. judges the validity of reading assignments
   3. maintains a folder with class notes and related handouts
   4. draws conclusions and makes inferences from reading assignments and verbally communicates to classmates
   5. selects appropriate software and uses computers to complete tutorial assignments

II. FOUNDATION SKILLS

A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
   1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
      a. reads and studies textbook and reading assignments
b. interprets reading assignments
c. locates and interprets written information including graphs, charts and periodical articles
d. interprets class schedule

2. **Writing:** Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. completes written assignments
   b. takes class notes
   c. applies reading skills in a writing situation

3. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
   a. receives/interprets lecture material
   b. responds to verbal messages
   c. confirms verbal message interpretations with instructor and peers, both in and out of class
   d. makes appropriate behavior responses to verbal messages
   e. participates in discussion and identification of the difference between listening and hearing

4. **Speaking:** Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organizes ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required skill

B. **Thinking Skills:** Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking:** Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the "brain-storming" process
   c. participates in group problem solving process
   d. practices the team approach to problem solving

2. **Decision Making:** Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. identifies actions required to accomplish personal goals

3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility

4. **Seeing Things In the Mind's Eye:** Organizes and processes symbols, pictures, graphs, objects, and other information
   a. interprets graphical data
   b. interprets non-verbal communication in the classroom

5. **Knowing How to Learn:** Uses efficient learning techniques to acquire and apply new knowledge and skills
a. completes and interprets learning style inventory
b. utilizes techniques for creative thinking
c. develops strategies for effective problem solving approaches

6. **Reasoning**: *Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem*
   a. performs self-analysis of effective learning style
   b. selects appropriate communication form (oral vs. written)

C. **Personal Qualities**: *Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.*

1. **Responsibility**: *Exerts a high level of effort and perseveres towards goal attainment*
   a. develops stress management techniques that facilitate and encourage achievement of academic and personal goals
   b. accepts responsibility for effective written and oral communication

2. **Self-Esteem**: *Believes in own self-worth and maintains a positive view of self*
   a. develops interpersonal skills permitting a positive projection of self
   b. participates in classroom discussions about self-esteem

3. **Sociability**: *Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings*
   a. develops effective communication across cultures
   b. interacts with peers and listens effectively and provides constructive criticism
   c. learns to distinguish between sympathy and empathy

4. **Self-Management**: *Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control*
   a. monitors/assesses personal goal progress

5. **Integrity/Honesty**: *Chooses ethical courses of action*
   a. meets specific criteria standards to successfully complete the course
   b. encouraged to accept ethical and honest courses of action set by example
   c. provide situations and group activities for students to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills
Technology Program

MAST

COURSE SYLLABUS

WRITING SKILLS I
(REMEDIATION)
MAST PROGRAM  
COURSE SYLLABUS  
WRITING SKILLS I

Lecture hours/week:  1  
Lab hours/week:  3  
Credit hours:  2

COURSE DESCRIPTION:

An introductory course designed to assist students in essential written communication skills. It includes studies in the sentence and its parts, punctuation, capitalization, the parts of speech, spelling, and language usage.

PREREQUISITES:  
English placement test

REQUIRED COURSE MATERIALS:

Recommended Textbooks:  

Supplies:  
Notebook paper
Pens (2)
Liquid paper
Dictionary

COURSE OBJECTIVES:

Upon completion of this course, the student will:
1. Locate subjects and verbs in given sentences;
2. Write sentences using subjects and verbs correctly;
3. Define and use the eight parts of speech in sentences;
4. Use the appropriate punctuation marks correctly in sentences;
5. Capitalize words correctly in given sentences;
6. Write sentences using a variety of clauses and phrases;
7. Use conjunctions to join and combine sentences;
8. Revise sentences containing fragments, run-ons, and comma splices.

Lecture:

The lecture consists of instructor explanation of the grammar, mechanics, and sentence combining techniques that compose the material that is covered for the week.
Laboratory:

Lab is designed to supplement and reinforce the material that has been presented during weekly lectures. During the lab time, students, under the guidance of the instructor, work exercises in the workbook. These exercises are corrected during the lab period. Any student who has had difficulty with any exercises has the opportunity to clarify material. Also, the lab periods give the instructor the opportunity to supervise the student's work individually and to offer immediate assistance. In addition, the instructor can request that the student see him/her privately if the instructor perceives that a particular student is having great difficulty with the material.

**LECTURE OUTLINE**

<table>
<thead>
<tr>
<th>Lecture Topics</th>
<th>Text Reference Page</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation/Initial Writing Assignment</td>
<td>Book: Basic English Review</td>
<td></td>
</tr>
<tr>
<td>Nouns</td>
<td>Unit 2</td>
<td></td>
</tr>
<tr>
<td>Pronouns</td>
<td>Unit 3</td>
<td></td>
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<tr>
<td>Verbs</td>
<td>Unit 4 and 5</td>
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<tr>
<td>TEST</td>
<td></td>
<td></td>
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<tr>
<td>Adjectives and Adverbs</td>
<td>Unit 6</td>
<td></td>
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<tr>
<td>TEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepositions</td>
<td>Unit 7</td>
<td></td>
</tr>
<tr>
<td>Interjections</td>
<td>Unit 1</td>
<td></td>
</tr>
<tr>
<td>TEST</td>
<td></td>
<td></td>
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<tr>
<td>Conjunctions</td>
<td>Unit 7</td>
<td></td>
</tr>
<tr>
<td>TEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kinds of Sentences</td>
<td>Unit 1</td>
<td></td>
</tr>
<tr>
<td>Phrases and Clauses</td>
<td>Unit 8</td>
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<tr>
<td>Sentence Classification</td>
<td>Unit 11</td>
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<tr>
<td>TEST</td>
<td></td>
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<tr>
<td>Punctuation and Capitalization</td>
<td>Unit 9</td>
<td></td>
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<tr>
<td>TEST</td>
<td></td>
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<tr>
<td>Sentence Combining Techniques</td>
<td>Book: Sentence Combining, A Composing Book</td>
<td></td>
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<tr>
<td>Instructor will assign the clusters</td>
<td>Units 1, 2 and 3</td>
<td></td>
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<tr>
<td>TEST (WEEKLY) REVIEW</td>
<td></td>
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<tr>
<td>FINAL EXAM</td>
<td></td>
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<tr>
<td>STUDENT CONFERENCE</td>
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</table>

**Total Lecture Hours** 12

**LAB OUTLINE**

<table>
<thead>
<tr>
<th>Lab Topics</th>
<th>Contact Hrs.</th>
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<tbody>
<tr>
<td>Initial Writing Assignment</td>
<td>Book: Basic English Review</td>
</tr>
<tr>
<td>Nouns</td>
<td>Unit 2</td>
</tr>
<tr>
<td>Pronouns</td>
<td>Unit 3</td>
</tr>
<tr>
<td>Verbs</td>
<td>Unit 4 and 5</td>
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</tbody>
</table>
COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary’s Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its “AMERICA 2000 REPORT” that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. Resources: Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks on time
      2. students select and use appropriate video and computer software tutorials
      3. provides a self-evaluation of performance based on the time and quality of work
      4. maintain a record of grades and assesses academic progress and makes necessary adjustments
   B. Interpersonal: Works with others
      1. participates as a member of a team through class discussions and group projects; works cooperatively with others and contributes to the group process with ideas and suggestions; students are assigned to a group to share ideas
      2. provides feedback to peers and instructors
      3. works with diversity through interaction with class members of varied ethnic, religious, gender and social backgrounds
   C. Information: Acquires and uses information
      1. maintains individual student progress records and assesses academic progress
      2. organizes and maintains class handouts and homework assignments in a individual student folder
3. students participate in assessment and knowledge of writing skills
   providing feedback to the instructor and classmates

4. uses appropriate computer tutorial software applications

D. Systems: Understands complex inter-relationships
   1. understands the system involved in the writing process
   2. monitors and corrects performance during the writing process

E. Technology: Works with a variety of technologies
   1. selects and uses appropriate software applications in the writing lab
   2. understands proper procedures for set-up of computer and its software to
      meet individual writing needs

II. FOUNDATION SKILLS:
A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations,
   listens, and speaks.
   1. Reading: Locates, understands, and interprets written information in
      prose and in documents such as manuals, graphs, and schedules
      a. reads and studies textbook and workbook
      b. interprets reading assignments
      c. interprets class schedule
      d. identifies and locates the eight different parts of speech
   2. Writing: Communicates thoughts, ideas, information, and messages in
      writing; and creates documents such as letters, directions, manuals,
      reports, graphs, and flow charts
      a. completes written assignments
      b. takes class notes
      c. composes sentences using the appropriate parts of speech and
         mechanics
   3. Arithmetic/Mathematics: Performs basic computations and approaches
      practical problems by choosing appropriately from a variety of
      mathematical techniques.
      a. computes individual class average
   4. Listening: Receives, attends to, interprets, and responds to verbal
      messages and other cues
      a. receives/interprets lecture material
      b. responds to verbal messages
      c. confirms verbal message interpretations with instructor and peers,
         both in and out of class
      d. makes appropriate behavior responses to verbal messages
      e. participates in discussion and identification of the difference
         between listening and hearing
   5. Speaking: Organizes ideas and communicates orally
      a. participates in classroom discussions
      b. organizes ideas and communicates specific questions to the
         instructor
      c. verbally affirms understanding of a concept, procedure, or required
         skill
      d. communicates with peers to ensure the smooth and safe operation
         of the laboratory
B. **Thinking Skills:** Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking:** Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in group problem solving process
   c. practices the team approach to problem solving

2. **Decision Making:** Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. identifies actions required to accomplish personal goals

3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. accepts responsibility

4. **Seeing Things In the Mind’s Eye:** Organizes and processes symbols, pictures, graphs, objects, and other information
   a. interprets non-verbal communication in the classroom

5. **Knowing How to Learn:** Uses efficient learning techniques to acquire and apply new knowledge and skills
   a. develops techniques for adapting learning style for differences in teaching style
   b. utilizes techniques for creative thinking
   c. develops strategies for effective problem solving approaches

6. **Reasoning:** Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. performs self-analysis of effective learning styles for specific situations
   b. selects appropriate communication form
   c. identifies and utilizes the rule of English writing

C. **Personal Qualities:** Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility:** Exerts a high level of effort and perseveres towards goal attainment
   a. develops stress management techniques that facilitate and encourage achievement of academic and personal goals
   b. accepts responsibility for effective written and oral communication

2. **Self-Esteem:** Believes in own self-worth and maintains a positive view of self
   a. develops interpersonal skills permitting a positive projection of self through positive reinforcement on daily basis

3. **Sociability:** Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. develops effective communication across cultures
   b. interacts with peers and listens effectively and provides constructive criticism
   c. learns to distinguish between sympathy and empathy
4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. monitors/assesses personal goal progress
   b. provided with goals of the course and is expected to apply the mechanic of writing and sentence combining techniques

5. **Integrity/Honesty:** Chooses ethical courses of action
   a. meets specific criteria standards to successfully complete the course
   b. encouraged to accept ethical and honest courses of action set by example
Machine Tool Advanced Skills Technology Program

MAST

COURSE SYLLABUS

WRITING SKILLS II
(REMEDICATION)
MAST PROGRAM
COURSE SYLLABUS
WRITING SKILLS II

Lecture hours/week: 2    Lab hours/week: 2    Credit hours: 3

COURSE DESCRIPTION:

Review of basic sentence grammar and mechanical skills, with an emphasis on writing, editing, and revising paragraphs. Introduction to the multi paragraph essay.

PREREQUISITES: English placement test

RECOMMENDED COURSE MATERIALS:


Supplies:
Spiral Notebook with perforated tear sheets
Ballpoint pens with black or blue ink
Liquid paper
Comprehensive, paperback, college dictionary
Scantron sheets, 2 packages

COURSE OBJECTIVES:

Upon completion of this course, the student will:
1. use appropriate pre-writing techniques to narrow subjects, generate topic ideas, and produce focused topic sentences and thesis statements;
2. write unified and well-developed paragraphs with specific topic sentences by following appropriate organizational plans;
3. plan and write a short well-organized essay, containing a specific thesis statement, an effective introduction, a well-developed body, and an appropriate conclusion;
4. revise paragraphs and essays for coherence, organization, sentence variety, language usage, consistence, and parallel structure;
5. edit paragraphs and essays for grammar, punctuation, and spelling.

LECTURE OUTLINE:

<table>
<thead>
<tr>
<th>Lecture Topics</th>
<th>Text Reference Page</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation to course</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Agreement</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>A. The simple sentence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Subject-verb agreement</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>
C. Pronoun-antecedent agreement

The sentence
A. Coordination/subordination
B. Fragments
C. Comma splices and run-ons

Punctuation and mechanics
A. The apostrophe
B. The comma
C. The colon
D. Capitalization
E. Titles
F. Quotations

Consistency and parallelism
A. Tense
B. Person
C. Number
D. Discourse
E. Parallel structure

Sentence variety in paragraph writing
A. Mixing long and short sentences
B. Mixing types of sentences
C. Varying beginnings of sentences
D. Joining ideas

Paragraph development and unity
A. Generating ideas
B. Narrowing the topic
C. Writing the topic
D. Developing ideas for the body
E. Arranging ideas in a plan

Paragraph organization and coherence
A. Coherence through order
   1. Time order
   2. Space order
   3. Order of climax
B. Coherence through transitional devices
   1. Repeating words and pronouns
   2. Using synonyms and substitutions
   3. Using transitional expressions

Language usage in paragraph writing
A. Using exact language
B. Using concise language
C. Using original language
D. Using figurative language

The Essay
A. Structure
B. The thesis statement
C. Planning the body
D. Ordering and linking body paragraphs

All
E. Writing the first draft
F. Revising the first draft
G. Editing the first draft
H. Writing the final draft

Total Lecture Hours 24

LAB OUTLINE:

<table>
<thead>
<tr>
<th>Lab Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreement practice</td>
<td>2</td>
</tr>
<tr>
<td>The sentence practice</td>
<td>2</td>
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<tr>
<td>Punctuation and mechanics practice</td>
<td>2</td>
</tr>
<tr>
<td>Consistency and parallelism practice</td>
<td>3</td>
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<tr>
<td>Sentence variety in paragraph writing practice</td>
<td>2</td>
</tr>
<tr>
<td>Paragraph development and unity practice</td>
<td>3</td>
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<tr>
<td>Paragraph organization and coherence practice</td>
<td>3</td>
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<tr>
<td>Language usage in paragraph writing practice</td>
<td>3</td>
</tr>
<tr>
<td>The Essay practice</td>
<td>3</td>
</tr>
<tr>
<td>Final Exam</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Lab Hours 24

COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary’s Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its “AMERICA 2000 REPORT” that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
A. Resources: Identifies, organizes, plans, and allocates resources
   1. follows a schedule to complete assigned tasks on time
   2. provides a self-evaluation of performance based on the time and quality of work
   3. maintains a record of individual academic performance, evaluating academic progress and adjusts accordingly

B. Interpersonal: Works with others
   1. participates as a member of a team through class discussions and group projects; works cooperatively with others and contributes to the group process with ideas and suggestions
   2. provides peer evaluation and feedback on writing assignments
3. works with diversity through interaction with class members of varied ethnic, religious, gender, and social backgrounds

C. **Information: Acquires and uses information**
   1. applies appropriate skills and techniques of writing to develop, evaluate, and revise individual compositions
   2. develops organized plan for writing paragraphs and essays
   3. applies learned writing skills and process to communicate information in an organized manner

D. **Systems: Understands complex inter-relationships**
   1. understands the system involved in the writing process
   2. monitors and corrects performance during the writing process

E. **Technology: Works with a variety of technologies**
   1. selects appropriate software applications in the writing lab
   2. applies appropriate software applications in the writing laboratory

II. **FOUNDATION SKILLS**
A. **Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.**
   1. **Reading:** Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
      a. reads and studies textbook, workbook, and reading assignments
      b. interprets reading assignments
      c. locates and interprets written information
      d. interprets class schedule
   2. **Writing:** Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
      a. completes written assignments including paragraphs, sentence combining, and essay
      b. takes class notes
   3. **Arithmetic/Mathematics:** Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
      a. computes individual grade through the maintenance of a student grade record
   4. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
      a. receives/interprets lecture material
      b. responds to verbal messages
      c. confirms verbal message interpretations with instructor and peers, both in and out of class
      d. makes appropriate behavior responses to verbal messages
   5. **Speaking:** Organizes ideas and communicates orally
      a. participates in classroom discussions
      b. organizes ideas and communicates specific questions to the instructor
      c. verbally affirms understanding of a concept, procedure, or required skill
B. **Thinking Skills**: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking**: Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in group problem solving process

2. **Decision Making**: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. selects alternative paragraph and essay topics
   b. identifies actions required to accomplish personal goals

3. **Problem Solving**: Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. accepts responsibility

4. **Seeing Things In the Mind’s Eye**: Organizes and processes symbols, pictures, graphs, objects, and other information
   a. students are provided with a graphical analogy for paragraph and essay structure to assist in the visualization and application of writing skill development
   b. interprets non-verbal communication in the classroom

5. **Knowing How to Learn**: Uses efficient learning techniques to acquire and apply new knowledge and skills
   a. develops techniques for adapting learning style for differences in teaching style
   b. utilizes techniques for creative thinking
   c. applies learned writing skills to generate ideas for paragraph and essay construction

6. **Reasoning**: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. applies the rules and principles of basic grammar and mechanics to construct and edit sentences

C. **Personal Qualities**: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility**: Exerts a high level of effort and perseveres towards goal attainment
   a. develops stress management techniques that facilitate and encourage achievement of academic and personal goals
   b. accepts responsibility for effective written and oral communication

2. **Self-Esteem**: Believes in own self-worth and maintains a positive view of self
   a. develops interpersonal skills permitting a positive projection of self through daily positive feedback from the instructor

3. **Sociability**: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. develops effective communication across cultures
   b. Interacts with peers and listens effectively and provides constructive criticism
4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. Monitors/assesses personal goal progress

5. **Integrity/Honesty:** Chooses ethical courses of action
   a. meets specific criteria standards to successfully complete the course
   b. encouraged to accept ethical and honest courses of action set by example
   c. provide situations and group activities for students to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills
Technology Program
MAST

COURSE SYLLABUS

BASIC MATHEMATICS
(REMEDIATION)
**MAST PROGRAM**
**COURSE SYLLABUS**
**BASIC MATHEMATICS**

<table>
<thead>
<tr>
<th>Lecture hours/week: 2</th>
<th>Lab hours/week: 3</th>
<th>Credit hours: 3</th>
</tr>
</thead>
</table>

**COURSE DESCRIPTION:**

The purpose of this course is to provide a review of the fundamentals of mathematics by stressing practical applications. It includes the concepts of whole numbers, fractions, decimals, measurement and geometry, operations with signed numbers, and solutions of simple linear equations.

**PREREQUISITES:** Placement by Computer Placement Test (CPT)

**REQUIRED COURSE MATERIALS:**

- **Supplies:**
  - 3-ring notebook
  - notebook paper
  - pencils
  - Scantron form 882 w/100 answers

**COURSE OBJECTIVES:**

This course will include practical applications of each topic in reviewing the concepts of Basic Mathematics. Upon completion of the course the student should be able to:

1. Solve various types of practical problems requiring subtraction, multiplication, and division of whole numbers. Order of operations will be included;
2. Solve practical problems requiring addition, subtraction, multiplication, and division of two or more common fractions or mixed numbers;
3. Add, subtract, multiply, and divide decimal numbers and express the answer of all practical applications to the required decimal place. Conversions between decimal numbers, fractions, and percents will be included;
4. Apply addition, subtraction, multiplication, division, and conversions of units of measurement within the English system and express the answers to all practical applications in simplest form;
5. Convert units of measurement within the metric system and solve practical applications requiring addition, subtraction, multiplication, and division of metric units. Conversions between the metric system and the English system will be included;
6. Determine the perimeter, area, or volume of a standard geometric figure and express the answer to a practical problem in the required units of measurement. The basic concepts of angles, lines, and geometric figures will be covered;
7. Add, subtract, multiply, and divide signed numbers. This includes order of operations and evaluating expressions;
8. Solve simple linear equations. Translating sentences into equations and solving will be included.

**LECTURE OUTLINE:**

<table>
<thead>
<tr>
<th>Lecture Topic</th>
<th>Text Reference Page</th>
<th>Contact Hrs.</th>
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</thead>
<tbody>
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<td>Course Introduction</td>
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<tr>
<td>Whole Numbers</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>a. Addition</td>
<td></td>
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<tr>
<td>b. Subtraction</td>
<td></td>
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<tr>
<td>c. Multiplication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Division</td>
<td></td>
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<tr>
<td>e. Order of Operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fractions and Mixed Numbers</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>a. Reducing Fractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Changing to Equivalent Fractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Greatest Common Denominator</td>
<td></td>
<td></td>
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<tr>
<td>d. Least Common Denominator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Addition</td>
<td></td>
<td></td>
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<tr>
<td>f. Subtraction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Multiplication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Division</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Applied Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decimal Numbers</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>a. Reading and Writing Decimal Numbers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Rounding off Decimal Numbers</td>
<td></td>
<td></td>
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<tr>
<td>to a Given Place Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Converting Numbers between</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decimal, Fraction, Percent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Addition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Multiplication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Division</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Applied Problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>a. Converting Units of Distance,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight, and Capacity within the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English (U.S. Customary) System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Converting Units of Distance,</td>
<td></td>
<td>108</td>
</tr>
<tr>
<td>Weight, and Capacity within</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
the Metric System
c. Converting Units of Distance, Weight, and Capacity between the English System and the Metric System
d. Addition, Subtraction, Multiplication, and Division of English and Metric Units
e. Applied Problems

Geometry
a. Angles, Lines, and Geometric Figures
b. Perimeters of Standard and Composite Geometric Figures
c. Areas of Standard and Composite Geometric Figures
d. Volumes of Standard and Geometric Solids

Rational Numbers
a. Introduction to Integers
b. Addition and Subtraction of Integers
c. Multiplication and Division of Integers
d. Operations with Rational Numbers
e. Order of Operations

Introduction to Algebra
a. Variable Expressions
b. Introduction to Equations
c. Solving One-Step Linear Equations
d. Solving Multi-Step Linear Equations
e. Translating Verbal Expression into Mathematical Expressions
f. Translating Sentences into Equations and Solving

Total Lecture Hours 24

LAB OUTLINE

<table>
<thead>
<tr>
<th>Lab Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Numbers Practice</td>
<td>4</td>
</tr>
<tr>
<td>Fractions and Mixed Numbers Practice</td>
<td>5</td>
</tr>
<tr>
<td>Decimal Numbers Practice</td>
<td>5</td>
</tr>
</tbody>
</table>

Three hours per week in the classroom will be considered laboratory activity. The student will utilize this time working on current assignments with the assistance of the instructor.
COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. Resources: Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks on time
      2. provide a self-evaluation of performance based on the time and quality of work
   B. Interpersonal: Works with others
      1. participates in classroom dialogue, contributing to group effort in problem solving
      2. works well with all members of the class
   C. Information: Acquires and uses information
      1. apply mathematical solutions to problems assigned
      2. organize and maintain lecture notebook and assignment notebook
      3. communicates/interprets information by participating in classroom dialogue
      4. uses 050 computer tutorials as necessary
   D. Systems: Understands complex inter-relationships
      1. applies a systematic approach to solving mathematical problems
      2. develops an understanding of mathematical system complexity with applications to algebra, geometry, and trigonometric equation solving
   E. Technology: Works with a variety of technologies
      1. selects appropriate calculator to meet the needs of the course
      2. selects appropriate methods to solve mathematical problems
      3. selects appropriate measurement procedures
      4. applies mathematical problem solving skills using a scientific calculator

II. FOUNDATION SKILLS
   A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks.
1. **Reading**: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
   a. interprets word problems, tables, graphs, and drawings to identify presented problem(s)
   b. reads and studies textbook, available tutorials, and video tapes
   c. uses available tutorials in the laboratory as needed
2. **Writing**: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. communicates problem solving skills by solving mathematical problems in writing using presented information
   b. maintains a lecture notebook
   c. completes all written assignments
3. **Arithmetic/Mathematics**: Perform basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
   a. performs applied computations of arithmetic, algebra, geometry, and trigonometry
   b. performs applied computations of measurement conversions
4. **Listening**: Receives, attends to, interprets, and responds to verbal messages and other cues
   a. assimilate classroom instruction
   b. interpret and assimilate video instruction
   c. observe laboratory demonstrations
   d. seek and receive individualized instruction in the laboratory
   e. participates as an active listener in classroom instruction
5. **Speaking**: Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organize ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required mathematical skill
   d. communicates with peers

B. **Thinking Skills**: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.
1. **Creative Thinking**: Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the “brain-storming” process
   c. participates in group problem solving process
   d. practices the team approach to problem solving
2. **Decision Making**: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. selects specific math applications
3. **Problem Solving**: Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
c. balances social and academic life/responsibilities
d. accepts responsibility

4. Seeing Things In the Mind's Eye: Organizes, and processes symbols, pictures, graphs, objects, and other information
   a. prepares sketches, graphs, and tables to assist in understanding word problems
   b. interprets word problems
   c. assimilates arithmetic problems in class
   d. interprets non-verbal communication in the classroom

5. Knowing How to Learn: Use efficient learning techniques to acquire and apply new knowledge and skills
   a. recognizes relevant information to solve specific problem(s)
   b. identifies “given” data and applies appropriate equations
   c. demonstrates mastery of basic math skills
   d. uses sequential math skills to support mastery of new skills
   e. thinks through the problem mentally before selecting appropriate formula(e)/equation(s)

6. Reasoning: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. understands that the ability to apply mathematics requires “practice”
   b. understands the necessity to perform math as applied to specific technology
   c. selects appropriate mathematical application after considering all given data

C. Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. Responsibility: Exerts a high level of effort and perseveres towards goal attainment
   a. develops an understanding that in order to be successful in mathematics, preparation for the day’s work is necessary
   b. develops an understanding that classroom attendance is essential for success in the course
   c. accepts the responsibility for active participation in class

2. Self-Esteem: Believes in own self-worth and maintains a positive view of self
   a. learns to take pride in his or her work through positive reinforcement
   b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal
   c. understands that an individual with a positive attitude and the belief in their own abilities will systematically seek solutions and be a valuable employee
   d. accepts shared common goals of the class and views each individual as an asset to the group

3. Sociability: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. assist classmates in improving mathematical skills
b. assist students with special needs as a peer mentor

c. share laboratory resources

d. assist classmates in understanding math applications in a group

4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control

a. maintain a record of academic achievement (individual grade book)

b. accept the responsibility for self-management

c. set goals and complete assigned tasks

5. **Integrity/Honesty:** Chooses ethical courses of action

a. accept the responsibility for own actions

b. exhibit personal honesty at all times

c. accept the challenge of doing your own work in the laboratory, during examination, and on outside assignments

d. understand the consequences of unethical behaviors
Machine Tool Advanced Skills Technology Program

MAST

COURSE SYLLABUS

BEGINNING ALGEBRA I
(REMEDICATION)

114
MAST PROGRAM
COURSE SYLLABUS
BEGINNING ALGEBRA I

Lecture hours/week: 2  Lab hours/week: 3  Credit hours: 3

COURSE DESCRIPTION:

The purpose of this course is to give a background in pre-algebra and elementary algebraic concepts. It includes the concepts of signed numbers, evaluating expressions, polynomials, operations with algebraic expressions, and factoring.

PREREQUISITES: Basic Mathematics or Diagnostic Placement Testing

REQUIRED COURSE MATERIALS:

Recommended

Supplies: notebook paper
pencils
Scantron form 882 w/100 answers
1 - 5.25 floppy disk

COURSE OBJECTIVES:

Upon completion of the course the student will:
1. Add, subtract, multiply, and divide signed numbers following the proper order of operations;
2. Apply the laws of exponents;
3. Perform additions, subtractions, multiplications, and divisions with algebraic expressions;
4. Manipulate formulae;
5. Find special products;
6. Factor polynomials.

LECTURE OUTLINE:

<table>
<thead>
<tr>
<th>Lecture Topics</th>
<th>Text Reference Page</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enrolled in Beginning Algebra I are scheduled in class for a period of two (2) lecture hours per week and three (3) lab hours per week.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations with Real Numbers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Order of Operations with</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>
Whole Numbers
b. Absolute Value
c. Addition, Subtraction, Multiplication, and Division of Signed Numbers
d. Meaning of Exponents
e. Order of Operations with Real Numbers
f. Evaluating Expressions and Formulas

Exponents and Algebraic Expression
a. Laws of Exponents
b. Scientific Notation
c. Combining "Like" Terms
d. Addition and Subtraction of Polynomials
e. Multiplication and Division of Polynomials

Factoring
a. Finding the Greatest Common Factor
b. Factoring by Grouping
c. Factoring the Difference of Two Squares
d. Factoring Trinomials of the Form $ax^2 + bx = c$
e. Composite Factoring
f. Factoring the Sum and Difference of Cubes

**Total Lecture Hours** 24

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**LAB OUTLINE:**

<table>
<thead>
<tr>
<th>Lab Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations with Real Numbers</td>
<td>9</td>
</tr>
<tr>
<td>Mentor lessons 0-67 (omit lesson 2)</td>
<td></td>
</tr>
<tr>
<td>Exponents and Algebraic Expressions</td>
<td>10</td>
</tr>
<tr>
<td>Mentor lessons 91-129, 66, 157-163</td>
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</tr>
<tr>
<td>Factoring</td>
<td>12</td>
</tr>
<tr>
<td>Mentor lessons 130-156 (omit lesson 140)</td>
<td></td>
</tr>
<tr>
<td>Testing</td>
<td>5</td>
</tr>
</tbody>
</table>

**Total Lab Hours** 36
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      2. works well with all members of the class
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   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility

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a. prepares sketches, graphs, and tables to assist in understanding word problems  
b. interprets word problems  
c. assimilates arithmetic problems in class  
d. interprets non-verbal communication in the classroom

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b. identifies "given" data and applies appropriate equations  
c. demonstrates mastery of basic math skills  
d. uses sequential math skills to support mastery of new skills  
e. thinks through the problem mentally before selecting appropriate formula(e)/equation(s)

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b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal  
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   c. set goals and complete assigned tasks

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   a. accept the responsibility for own actions
   b. exhibit personal honesty at all times
   c. accept the challenge of doing your own work in the laboratory, during examination, and on outside assignments
   d. understand the consequences of unethical behaviors
Machine Tool Advanced Skills Technology Program

MAST

COURSE SYLLABUS

BEGINNING ALGEBRA II
(REMEDIATION)
MAST PROGRAM
COURSE SYLLABUS
BEGINNING ALGEBRA II

Lecture hours/week: 2  Lab hours/week: 3  Credit hours: 3

COURSE DESCRIPTION:

This course is designed as a continuation of Beginning Algebra I. It begins with rational expressions followed by linear and quadratic equations, formulas and word problems. A basic geometry section will also be included.

PREREQUISITES:  Beginning Algebra I

REQUIRED COURSE MATERIALS:


Supplies:  notebook paper
          pencils
          Scantron form 882 w/100 answers
          1 - 5.25 floppy disk

COURSE OBJECTIVES:

Upon completion of the course the student will:
1. Reduce algebraic fractions
2. Multiply and divide algebraic fractions
3. Add and subtract algebraic fractions with a common denominator
4. Find the least common multiple
5. Add and subtract algebraic fractions with unlike denominators
6. Simplify complex algebraic fractions
7. Add and subtract complex algebraic fractions
8. Factor completely and reduce algebraic fractions
9. Solve linear equations using the addition and multiplication properties
10. Solve linear equations with a variable on only one side of the equation
11. Solve linear equations with variables on both sides of the equation
12. Solve linear equations involving fractions
13. Solve formulas for indicated variables
14. Insert the symbols ≤, ≥, or = to make a statement true
15. Solve ratios and proportions using cross multiplication
16. Change word problems into equations
17. Solve number and motion problems
18. Solve mixture and geometric problems
19. Find the area of a rectangle
20. Find the volume of a rectangular solid
21. Find the area of a:
   a. Square
   b. Triangle
   c. Circle
   d. Trapezoid
22. Find the volume of a cube and a curve
23. Find the volume, lateral area and total surface area of a cylinder
24. Find the volume of a pyramid and a sphere
25. Find the lateral surface area, total surface area and volume of a prism
26. Find the area of a sphere

LECTURE OUTLINE:

<table>
<thead>
<tr>
<th>Lecture Topic</th>
<th>Text Reference Page</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational Expressions</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>a. Reducing Rational Expressions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Multiplication and Division of Rational Expressions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Addition and Subtraction of Rational Expressions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Simplifying Complex Fractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Solving Rational Expressions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solving Linear Equations</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>a. Solving Equations Involving One Operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Solving Equations Involving More Than One Operation</td>
<td></td>
<td></td>
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<tr>
<td>c. Solving Equations Involving the Distributive Property</td>
<td></td>
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<tr>
<td>d. Solving Ratio and Proportion Problems</td>
<td></td>
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<tr>
<td>e. Solving Equations Containing Rational Expressions</td>
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<tr>
<td>f. Solving Quadratic Equations by Factoring</td>
<td></td>
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</tr>
<tr>
<td>g. Solving for a Variable in a Formula</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Translating Word Problems into Equations and Solving</td>
<td></td>
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</tr>
<tr>
<td>Geometry</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>a. Area and Volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Rectangle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Square</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Triangle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Circle
5. Trapezoid

b. Volume
1. Rectangle
2. Cube
3. Prism
4. Cone
5. Sphere
c. Cylinder
1. Lateral Area
2. Total Surface Area
3. Surface Area
4. Volume

Total Lecture Hours 24

LAB OUTLINE:

<table>
<thead>
<tr>
<th>Lab Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will practice algebraic skills through the use of Algebra Mentor (computer software from Brooks/Cole Publishing Company) or equivalent lab assignments from the text or handouts.</td>
<td></td>
</tr>
<tr>
<td>Rational Expressions</td>
<td>10</td>
</tr>
<tr>
<td>Solving Linear Equations</td>
<td>13</td>
</tr>
<tr>
<td>Geometric Lab Assignments</td>
<td>8</td>
</tr>
<tr>
<td>Testing</td>
<td>5</td>
</tr>
</tbody>
</table>

Total Lab Hours 36

COURSE OBJECTIVES: SCANS COMPETENCIES

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1. participates in classroom dialogue, contributing to group effort in problem solving
2. works well with all members of the class

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1. apply mathematical solutions to problems assigned
2. organize and maintain lecture notebook and assignment notebook
3. communicates/interprets information by participating in classroom dialogue
4. uses 050 computer tutorials as necessary

D. Systems: Understands complex inter-relationships
1. applies a systematic approach to solving mathematical problems
2. develops an understanding of mathematical system complexity with applications to algebra, geometry, and trigonometric equation solving

E. Technology: Works with a variety of technologies
1. selects appropriate calculator to meet the needs of the course
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3. selects appropriate measurement procedures
4. applies mathematical problem solving skills using a scientific calculator

II. FOUNDATION SKILLS
A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks.
1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
   a. interprets word problems, tables, graphs, and drawings to identify presented problem(s)
   b. reads and studies textbook, available tutorials, and video tapes
   c. uses available tutorials in the laboratory as needed
2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. communicates problem solving skills by solving mathematical problems in writing using presented information
   b. maintains a lecture notebook
   c. completes all written assignments
3. Arithmetic/Mathematics: Perform basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
   a. performs applied computations of arithmetic, algebra, geometry, and trigonometry
   b. performs applied computations of measurement conversions
4. Listening: Receives, attends to, interprets, and responds to verbal messages and other cues
   a. assimilate classroom instruction
   b. interpret and assimilate video instruction
   c. observe laboratory demonstrations
   d. seek and receive individualized instruction in the laboratory
   e. participates as an active listener in classroom instruction
5. Speaking: Organizes ideas and communicates orally
a. participates in classroom discussions
b. organizes ideas and communicates specific questions to the instructor
c. verbally affirms understanding of a concept, procedure, or required mathematical skill
d. communicates with peers

B. Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. Creative Thinking: Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the “brain-storming” process
   c. participates in group problem solving process
   d. practices the team approach to problem solving

2. Decision Making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. selects specific math applications

3. Problem Solving: Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility

4. Seeing Things In the Mind’s Eye: Organizes, and processes symbols, pictures, graphs, objects, and other information
   a. prepares sketches, graphs, and tables to assist in understanding word problems
   b. interprets word problems
   c. assimilates arithmetic problems in class
   d. interprets non-verbal communication in the classroom

5. Knowing How to Learn: Use efficient learning techniques to acquire and apply new knowledge and skills
   a. recognizes relevant information to solve specific problem(s)
   b. identifies “given” data and applies appropriate equations
   c. demonstrates mastery of basic math skills
   d. uses sequential math skills to support mastery of new skills
   e. thinks through the problem mentally before selecting appropriate formula(e)/equation(s)

6. Reasoning: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. understands that the ability to apply mathematics requires “practice”
   b. understands the necessity to perform math as applied to specific technology
   c. selects appropriate mathematical application after considering all given data

C. Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.
1. **Responsibility**: Exerts a high level of effort and perseveres towards goal attainment
   a. develops an understanding that in order to be successful in mathematics, preparation for the day's work is necessary
   b. develops an understanding that classroom attendance is essential for success in the course
   c. accepts the responsibility for active participation in class

2. **Self-Esteem**: Believes in own self-worth and maintains a positive view of self
   a. learns to take pride in his or her work through positive reinforcement
   b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal
   c. understands that an individual with a positive attitude and the belief in their own abilities will systematically seek solutions and be a valuable employee
   d. accepts shared common goals of the class and views each individual as an asset to the group

3. **Sociability**: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. assist classmates in improving mathematical skills
   b. assist students with special needs as a peer mentor
   c. share laboratory resources
   d. assist classmates in understanding math applications in a group

4. **Self-Management**: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. maintain a record of academic achievement (individual grade book)
   b. accept the responsibility for self-management
   c. set goals and complete assigned tasks

5. **Integrity/Honesty**: Chooses ethical courses of action
   a. accept the responsibility for own actions
   b. exhibit personal honesty at all times
   c. accept the challenge of doing your own work in the laboratory, during examination, and on outside assignments
   d. understand the consequences of unethical behaviors
Today's technology has created an information revolution. As machines become smarter, the employees who will use or operate these machines must also become smarter. Simply possessing good technical (hands-on) skills will not guarantee success in today's job market. The workplace of today demands that its operators are fully competent technicians. Also, front line managers must possess a much higher level of academic skills than was once thought necessary. This means that everyone involved in education must focus more on the "three R's" (reading, writing and arithmetic). America went through a period when they divided students into two groups: "College Bound" and "Vocational." This philosophy seemed to work well for many years, but with computer controlled machines and systems now commonplace on the shop floor, today's workers find more needs for reading, writing and doing manufacturing related computations. With the emphasis on total quality assurance and team management, a young person entering the workforce must possess good reading, writing and communication skills to survive and advance up through the ranks.

MAST has written each of the general education course syllabi for use in vocational/industrial training/educational colleges. Each of the course syllabi includes SCANS activities which may be useful in helping to foster some leadership traits which were found desirable by companies when the industrial interviews were conducted.
## GENERAL EDUCATION COURSES

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tr>
<td>ENGLISH</td>
<td>Introduction to Technical Communications</td>
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<tr>
<td>ENGLISH</td>
<td>Interpersonal Communications</td>
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<tr>
<td>ENGLISH</td>
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<tr>
<td>MATH</td>
<td>College Algebra</td>
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<tr>
<td>MATH</td>
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<tr>
<td>MATH</td>
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<td>PSYCHOLOGY</td>
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<td>PSYCHOLOGY</td>
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</tr>
<tr>
<td>PSYCHOLOGY</td>
<td>General Psychology</td>
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Machine Tool Advanced Skills Technology Program

MAST

GENERAL EDUCATION COURSE SYLLABUS

ORAL/WRITTEN COMMUNICATIONS
MAST PROGRAM
COURSE SYLLABUS
ORAL/WRITTEN COMMUNICATIONS

Lecture hours/week: 3  Lab hours/week: 0  Credit hours: 3

COURSE DESCRIPTION:

The techniques of oral and written communications most needed by the entry level technician. Emphasis will be on oral communications situations between peers, between technician and supervisor or subordinate, and between technician and groups.

PREREQUISITES:  NONE

REQUIRED COURSE MATERIALS:


Supplies:
- 8½ x 11 inch notebook paper - 200 sheets
- Erasable Ballpoint Pen (blue or black) - 2
- Typing Paper - 25 sheets
- #2 Pencils - 2
- Paperback Dictionary (your choice)
- Scantrons (2 packages)
- Notebook

COURSE OBJECTIVES:

Upon completion of the course, the student will be able to do the following:
1. understand and identify the principles of oral and written communication;
2. apply principles of English grammar to proofread and edit written material;
3. prepare a resume and letter of application;
4. after viewing a sample job interview, answer a set of questions with at least 70% accuracy;
5. recognize various business reports and memo formats;
6. prepare selected oral and written reports and memos;
7. recognize various business letter formats; and
8. prepare selected business letters.

COURSE OUTLINE:

<table>
<thead>
<tr>
<th>Topics</th>
<th>Contact Hrs.</th>
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<tbody>
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</tr>
<tr>
<td>Introductory Speeches</td>
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</table>
COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary’s Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its “AMERICA 2000 REPORT” that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. Resources: Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks on time
      2. provides a self-evaluation of performance based on the time and quality of work
      3. prepares and formulates short reports, memos, and letters
   B. Interpersonal: Works with others
      1. participates as a member of a team through class discussions and group projects; works cooperatively with others and contributes to the group process with ideas and suggestions
      2. provides feedback to peers and instructors
      3. works with diversity through interaction with class members of varied ethnic, religious, and social backgrounds
   C. Information: Acquires and uses information
      1. acquires and evaluates information through preparing graphs and charts and interpreting these graphs and charts
      2. organizes and maintains information by formulating letters, memos, and short reports; also uses critical thinking skills in making decisions, presenting informative, and demonstration speeches
      3. interprets articles from periodicals, newsletters, etc., relevant to individual student’s major and prepares short interpretive reports
      4. uses computers to prepare various required writing assignments
D. **Systems:** Understands complex inter-relationships
   1. understands systems; performs various tasks in the writing lab using appropriate computer software
   2. demonstrates knowledge and organizational structure and uses the chain of command
   3. monitors and corrects performance during the writing process in the writing lab

E. **Technology:** Works with a variety of technologies
   1. selects technology; applies computer and writing skills in the writing lab by using appropriate software
   2. monitors and corrects performance; understands proper procedures for set up of computer and its software to meet individual writing needs

II. **FOUNDATION SKILLS**
A. **Basic Skills:** Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
   1. **Reading:** Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
      a. reads and studies textbook and reading assignments
      b. interprets reading assignments
      c. locates and interprets written information including graphs, charts and periodical articles
      d. interprets class schedule
   2. **Writing:** Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
      a. completes written assignments, including memos, letters, graphs, and charts
      b. takes class notes
   3. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
      a. receives/interprets lecture material
      b. responds to verbal messages
      c. confirms verbal message interpretations with instructor and peers, both in and out of class
      d. makes appropriate behavior responses to verbal messages
      e. participates in discussion and identification of the difference between listening and hearing
   4. **Speaking:** Organizes ideas and communicates orally
      a. participates in classroom discussions
      b. organizes ideas and communicates specific questions to the instructor
      c. verbally affirms understanding of a concept, procedure, or required skill
      d. communicates with peers to ensure the smooth and safe operation of the laboratory

B. **Thinking Skills:** Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.
1. **Creative Thinking**: Generates new ideas  
   a. develops new ideas for approaching problem solving  
   b. participates in the "brain-storming" process  
   c. participates in group problem solving process  
   d. practices the team approach to problem solving  

2. **Decision Making**: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative  
   a. identifies personal goals  
   b. identifies actions required to accomplish personal goals  

3. **Problem Solving**: Recognizes problems and devises and implements plan of action  
   a. makes daily accommodations to stay on schedule  
   b. seeks additional instruction/clarification for assignment completion  
   c. balances social and academic life/responsibilities  
   d. accepts responsibility  

4. **Seeing Things In the Mind's Eye**: Organizes and processes symbols, pictures, graphs, objects, and other information  
   a. Interprets basic graphs and inspection reports; identifies inspection report symbols  
   b. interprets non-verbal communication in the classroom  

5. **Knowing How to Learn**: Uses efficient learning techniques to acquire and apply new knowledge and skills  
   a. develops techniques for adapting learning style for differences in teaching style  
   b. utilizes techniques for creative thinking  
   c. develops strategies for effective problem solving approaches  

6. **Reasoning**: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem  
   a. performs self-analysis of effective learning styles for specific situations  
   b. selects appropriate communication form (oral vs. written) to effectively apply communication skills "on-the-job"  
   c. communicates effectively within the workplace hierarchy  

C. **Personal Qualities**: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.  

1. **Responsibility**: Exerts a high level of effort and perseveres towards goal attainment  
   a. develops stress management techniques that facilitate and encourage achievement of academic and personal goals  
   b. accepts responsibility for effective written and oral communication "on-the-job"  

2. **Self-Esteem**: Believes in own self-worth and maintains a positive view of self  
   a. develops interpersonal skills permitting a positive projection of self  

3. **Sociability**: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings  
   a. develops effective communication across cultures
b. interacts with peers and listens effectively and provides constructive criticism

c. learns to distinguish between sympathy and empathy

4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. monitors/assesses personal goal progress
   b. performs goal setting activities such as resume preparation, completion of job application forms, and refinement of interviewing skills

5. **Integrity/Honesty:** Chooses ethical courses of action
   a. meets specific criteria standards to successfully complete the course
   b. encouraged to accept ethical and honest courses of action set by example
   c. provide situations and group activities for students to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills Technology Program

GENERAL EDUCATION COURSE SYLLABUS

INTRODUCTION TO TECHNICAL COMMUNICATIONS
MAST PROGRAM
COURSE SYLLABUS
INTRODUCTION TO TECHNICAL COMMUNICATIONS

Lecture hours/week: 2    Lab hours/week: 2    Credit hours: 3

COURSE DESCRIPTION:

Introduction to the nature of the communicative skills and thinking processes, with practical exercises in writing, reading, speaking, spelling, and vocabulary as related to technical areas.

PREREQUISITES:    NONE

REQUIRED COURSE MATERIALS:

Webster’s New World Dictionary (or any comprehensive dictionary)

Supplies:  8-1/2 “ 3-ring college rules white notebook paper
           erasable ball-point pen (one)
           ball-point pens (2)
           liquid paper
           scantron sheets, # 882, one package

COURSE OBJECTIVES:

Upon successful completion of Introduction to Technical Communications, the student will:
1. write coherent paragraphs which contain topic sentences and display proper composition techniques;
2. organize and write short reports;
3. compose business letters using proper style and form;
4. prepare a resume and letter of application to present to a prospective employer;
5. use outlining techniques to organize written and oral assignments;
6. deliver a well-prepared, concise, interesting oral report;
7. utilize the library; and
8. speak and write with improved grammar.

LECTURE OUTLINE:

<table>
<thead>
<tr>
<th>Lecture Topics</th>
<th>Text Reference Page</th>
<th>Contact Hrs.</th>
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</thead>
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<tr>
<td>Review of Grammar and Punctuation</td>
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<td>4</td>
</tr>
<tr>
<td>Paragraph Writing with Emphasis on</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Unity, Coherence, Good Sentences, and Correct Grammar and Punctuation

Basic Computer Writing Skills
Structuring and Outline; Writing an Explanation of Process
Achieving Emphasis in Writing: Subordination and Voice
Organizing Information; Seven Methods of Organization
Writing Strategies; Description and Comparison
Business Correspondence: Techniques of Letter Writing
Preparation for Work Force: Job Application, Preparation of Resume, Interview Techniques, Oral Reporting

Total Lecture Hours 24

LAB OUTLINE:

<table>
<thead>
<tr>
<th>Lab Topics</th>
<th>Contact Hrs.</th>
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</thead>
<tbody>
<tr>
<td>Working Exercises in Grammar and Punctuation:</td>
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</tr>
<tr>
<td>Correcting Exercises</td>
<td></td>
</tr>
<tr>
<td>Writing Paragraphs in Class; Presenting Rough Drafts for Constructive Criticism and Correction by Instructor</td>
<td>2</td>
</tr>
<tr>
<td>Structuring Outlines and Writing a Rough Draft of a Process Explanation</td>
<td>2</td>
</tr>
<tr>
<td>Working Exercises in Subordination, Voice, and Parallel Construction</td>
<td>2</td>
</tr>
<tr>
<td>Preparing a Formal Outline; Writing a Rough Draft of a Brief Technical Paper</td>
<td>2</td>
</tr>
<tr>
<td>Preparing Outlines for Papers to be Written Using Description and Comparison</td>
<td>2</td>
</tr>
<tr>
<td>Writing Rough Drafts of Business letters for Constructive Criticism by Instructor</td>
<td>2</td>
</tr>
<tr>
<td>Writing Letters of Applications, Resumes, filling out job applications</td>
<td>3</td>
</tr>
<tr>
<td>Testing</td>
<td>10</td>
</tr>
</tbody>
</table>

Total Lab Hours 24

COURSE OBJECTIVES: SCANS COMPETENCIES

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      3. interprets articles from periodicals, newsletters, etc., relevant to individual student's major and prepares short interpretive reports
      4. uses computers to prepare various required writing assignments
   D. Systems: Understands complex inter-relationships
      1. understands systems, performs various tasks in the writing lab using appropriate computer software
      2. demonstrates knowledge and organizational structure and uses the chain of command
      3. monitors and corrects performance during the writing process in the writing lab
   E. Technology: Works with a variety of technologies
      1. selects technology, applies computer and writing skills in the writing lab by using appropriate software
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II. FOUNDATION SKILLS
   A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
      1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
1. **Reading:** Reads and studies textbook and reading assignments
   a. reads and studies textbook
   b. interprets reading assignments
   c. locates and interprets written information including graphs, charts and periodical articles
   d. interprets class schedule

2. **Writing:** Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. completes written assignments, including memos, letters, graphs, and charts
   b. takes class notes

3. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
   a. receives/interprets lecture material
   b. responds to verbal messages
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3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility

4. **Seeing Things In the Mind's Eye:** Organizes and processes symbols, pictures, graphs, objects, and other information
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b. interprets non-verbal communication in the classroom

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c. communicates effectively within the workplace hierarchy

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1. **Responsibility:** Exerts a high level of effort and perseveres towards goal attainment
a. develops stress management techniques that facilitate and encourage achievement of academic and personal goals
b. accepts responsibility for effective written and oral communication "on-the-job"

2. **Self-Esteem:** Believes in own self-worth and maintains a positive view of self
a. develops interpersonal skills permitting a positive projection of self

3. **Sociability:** Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
a. develops effective communication across cultures
b. interacts with peers and listens effectively and provides constructive criticism
c. learns to distinguish between sympathy and empathy

4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
a. monitors/assesses personal goal progress
b. performs goal setting activities such as resume preparation, completion of job application forms, and refinement of interviewing skills

5. **Integrity/Honesty:** Chooses ethical courses of action
a. meets specific criteria standards to successfully complete the course
b. encouraged to accept ethical and honest courses of action set by example
c. provide situations and group activities for students to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills
Technology Program

MAST

GENERAL EDUCATION COURSE SYLLABUS

INTERPERSONAL COMMUNICATIONS
COURSE OBJECTIVES:

Upon completion of this course, the student will:

1. Employ models to demonstrate his/her communication effectiveness
2. Develop a self-concept that enhances communication
3. Engage in effective perception-checking
4. Distinguish between debilitative and facilitative emotions and demonstrate methods for managing them
5. Recognize the role of nonverbal behavior in decoding messages
6. Demonstrate the use of several effective listening response styles
7. Identify and describe key aspects of interpersonal relationships
8. Use feedback to confirm messages
9. Demonstrate non-defensive responses to criticism
10. Demonstrate the ability to make effective oral presentations
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<td>Course Expectations</td>
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<td>Autograph Party</td>
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<td>A First Look at Interpersonal Relationships</td>
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<tr>
<td>A First Look</td>
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<tr>
<td>Class Response (discussion)</td>
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<td>Coat of Arms (or Bag Speech)</td>
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<tr>
<td>Evaluation</td>
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<tr>
<td>The Self-Concept: Key to Communication</td>
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<tr>
<td>Examination of the Self-Concept</td>
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<td>Class Response (discussion)</td>
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<td>Presentations</td>
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<td>Perception: What you see is what you get.</td>
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<tr>
<td>Lecture on Perception</td>
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<tr>
<td>Class Response (discussion)</td>
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<td>Presentations</td>
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<td>Evaluation</td>
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<td>Emotions: Thinking and Feeling</td>
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<tr>
<td>Lecture on Emotions</td>
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<td>Class Response (discussion)</td>
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<td>Presentations</td>
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<tr>
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<td>Nonverbal Communication</td>
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<tr>
<td>Lecture on Nonverbal Communication</td>
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<tr>
<td>Class Response (discussion)</td>
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<tr>
<td>Presentations</td>
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<tr>
<td>Evaluation</td>
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<tr>
<td>Listening vs. Hearing</td>
<td>6</td>
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<tr>
<td>Lecture on Listening</td>
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<tr>
<td>Class Response (discussion)</td>
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<td>Presentations</td>
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<td>Evaluation</td>
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<td>Intimacy and Distance in Relationships</td>
<td>4</td>
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<tr>
<td>Lecture on Interpersonal Relationships</td>
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<td>Class Response (discussion)</td>
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<td>Presentations or other activity</td>
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<tr>
<td>Evaluation</td>
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<tr>
<td>Improving Communications Climates</td>
<td>4</td>
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<tr>
<td>Lecture on Communication Climates</td>
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<tr>
<td>Class Response (discussion)</td>
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<td>Presentations or other activity</td>
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<td>Evaluation</td>
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</table>
RESOLVING INTERPERSONAL CONFLICTS

Lecture on Resolving Conflicts
Class Response
Presentations or other activity
Evaluation

OR
A movie that incorporates interpersonal concepts
Movie (1st 50 minutes)
Movie (2nd 50 minutes)
Complete movie
Discuss movie
Final Exam
Completion of Course
Student Conferences
Course Wrap-Up

Total Lecture Hours 48

COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its “AMERICA 2000 REPORT” that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. Resources: Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks "on time"
      2. assesses academic progress, enters grades on a progress sheet, evaluates individual performance, and distributes work accordingly, providing feedback to the instructor
   B. Interpersonal: Works with others
      1. participate in group activities to review essays, anticipate questions for examinations, and participate in study groups
      2. participate as a “group leader” to coordinate/facilitate activities such as problem solving, individual participation, and provide feedback to the instructor
      3. work well with others from diverse backgrounds, including gender, ethnicity, race, and career goals diversities
   C. Information: Acquires and uses information
1. perform critical analysis exercises and communicate in both oral and written form to classmates and instructors
2. prepare critical essays
3. interprets essays and communicates individual interpretations to the class in both written and oral form
4. prepare essays and papers on the computer using appropriate software applications

D. Systems: Understands complex inter-relationships
1. understand systems; comprehends categorical organizational systems such as library classification of books, advertisements, and how writers use classification to organize ideas

E. Technology: Works with a variety of technologies
1. selects technology; selects appropriate software applications
2. applies technology to tasks; uses computer software applications and tutorial programs

II. FOUNDATION SKILLS
A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
1. Reading: Locates, understands, and interprets written information in prose and in documents, such as manuals, graphs, and schedules
   a. reading assignments are interpreted by individual students and in groups
   b. students locate written passages which illustrate specific ideas
   c. students interpret different styles of writing
2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents, such as letters, directions, manuals, reports, graphs, and flow charts
   a. students are required to write critical essays
   b. students are required to write critical analysis of writings
3. Listening: Receives, attends to, interprets, and responds to verbal messages and other cues
   a. listens to individual interpretations of essays and responds within the group to expressed interpretations
4. Speaking: Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organizes ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required skill

B. Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons.
1. Creative Thinking: Generates new ideas
   a. able to respond to diverse interpretations
   b. identifies actions required to accomplish personal goals
2. Decision Making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
a. evaluates performance and selects appropriate actions
b. identifies personal goals

3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
c. balances social and academic life/responsibilities
d. accepts responsibility
e. evaluates grammar, sentence structure, body of paper, etc., and takes appropriate actions

4. **Seeing Things In the Mind's Eye:** Organizes and processes symbols, pictures, graphs, objects, and other information.
   a. understands both written and verbal instructions

5. **Knowing How to Learn:** Use efficient learning techniques to acquire and apply new knowledge and skills
   a. learns to anticipate examination questions, categorize, describe, and explain efficient learning techniques
   b. uses these sequential skills to support mastery of new skills

6. **Reasoning:** Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. applies rules of word choice in composing essays

C. **Personal Qualities:** Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.
   1. **Responsibility:** Exerts a high level of effort and perseveres towards goal attainment
      a. attends class, meets deadlines, and writes legibly
      b. develops an understanding that in order to be successful in English, preparation for the day's work is necessary
c. accepts the responsibility for active participation in class
   2. **Self-Esteem:** Believes in own self-worth and maintains a positive view of self
      a. learns to take pride in his or her work through positive reinforcement
      b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal
   3. **Sociability:** Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
      a. participate in small group discussions
      b. assist students with special needs as a peer mentor
   4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
      a. maintain a record of academic achievement and monitor progress
      b. accept the responsibility for self-management
c. set goals and complete assigned tasks
d. monitors personal goal progress
   5. **Integrity/Honesty:** Chooses ethical courses of action
      a. accept the responsibility for own actions
b. exhibits personal honesty at all times  
c. accept the challenge of doing own work in class and on outside assignments  
d. accept the responsibility of doing own work on examinations  
e. understand the consequences of unethical behavior
Machine Tool Advanced Skills
Technology Program

MAST

GENERAL EDUCATION
COURSE SYLLABUS

COMPOSITION I
MAST PROGRAM
COURSE SYLLABUS
COMPOSITION I

Lecture hours/week: 4  Lab hours/week: 0  Credit hours: 3

COURSE DESCRIPTION:
Students study the process of composing essays, including pre-writing techniques, drafting, and revising and editing. Students write several multi-paragraph essays of various types, in both in-class and out-of-class settings. Students critically analyze sample student and professional essays. Prerequisite: Writing Skills II or equivalent as determined by the English placement test.

PREREQUISITE: Writing Skills II or equivalent as determined by the English placement test.

REQUIRED COURSE MATERIALS:

Supplies: College Level Dictionary
Large package of Notebook Paper
Liquid Paper (one bottle)
Ballpoint pens (blue or black)
#2 Pencils
Package of Scantron Forms
5-1/4" disk

COURSE OBJECTIVES:
Upon completion of this course, the student will:
1. Select a clearly defined subject and address it to a specific audience in a logical manner
2. Develop a unified and coherent theme that uses standard American grammar
3. Use a handbook and a dictionary as resources for writing
4. Compose written assignments using various strategies of informative and persuasive prose
5. Compose well organized answers to questions posed on written examinations
6. Critically analyze assigned essays

COURSE OUTLINE:

<table>
<thead>
<tr>
<th>Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>2</td>
</tr>
<tr>
<td>A. Initial Writing Assignment</td>
<td></td>
</tr>
</tbody>
</table>
B. Testing
Paragraph to Essay
A. Purpose and Audience
B. Planning and Organization of a Paragraph
C. Expanding the Paragraph to an Essay
D. Peer Editing
Types of Compositions
A. Description
B. Process *
C. Comparison - Analogy *
D. Classification *
E. Cause and Effect *
F. In-class Essay
Practical Applications
A. Essay Examinations
B. Critical Analysis
Conclusion
A. Preparation for Final Exam
B. Final Exam (required in order to receive a passing grade in the course)
C. Student Conferences

Total Lecture Hours 48

* may be persuasive or informative

COURSE OBJECTIVES: SCANS COMPETENCIES:

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
A. Resources: Identifies, organizes, plans, and allocates resources
   1. follows a schedule to complete assigned tasks "on time"
   2. assesses academic progress, enters grades on a progress sheet, evaluates individual performance, and distributes work accordingly, providing feedback to the instructor
B. Interpersonal: Works with others
   1. participate in group activities to review essays, anticipate questions for examinations, and participate in study groups
2. participate as a “group leader” to coordinate/facilitate activities such as problem solving, individual participation, and provide feedback to the instructor
3. work well with others from diverse backgrounds, including gender, ethnicity, race, and career goals diversities

C. Information: Acquires and uses information
1. perform critical analysis exercises and communicate in both oral and written form to classmates and instructors
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3. interprets essays and communicates individual interpretations to the class in both written and oral form
4. prepare essays and papers on the computer using appropriate software applications

D. Systems: Understands complex inter-relationships
1. understand Systems; comprehends categorical organizational systems such as library classification of books, advertisements, and how writers use classification to organize ideas

E. Technology: Works with a variety of technologies
1. selects technology; selects appropriate software applications
2. applies technology to tasks; uses computer software applications and tutorial programs

II. FOUNDATION SKILLS
A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks.
   1. Reading: Locates, understands, and interprets written information in prose and in documents, such as manuals, graphs, and schedules
      a. reading assignments are interpreted by individual students and in groups
      b. students locate written passages which illustrate specific ideas
      c. students interpret different styles of writing
   2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents, such as letters, directions, manuals, reports, graphs, and flow charts
      a. students are required to write critical essays
      b. students are required to write critical analysis of writings
   3. Listening: Receives, attends to, interprets, and responds to verbal messages and other cues
      a. listens to individual interpretations of essays and responds within the group to expressed interpretations
   4. Speaking: Organizes ideas and communicates orally
      a. participates in classroom discussions
      b. organize ideas and communicates specific questions to the instructor
      c. verbally affirms understanding of a concept, procedure, or required skill

B. Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons.
1. **Creative Thinking**: Generates new ideas
   a. able to respond to diverse interpretations
   b. identifies actions required to accomplish personal goals

2. **Decision Making**: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. evaluates performance and selects appropriate actions
   b. identifies personal goals

3. **Problem Solving**: Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility
   e. evaluates grammar, sentence structure, body of paper, etc., and takes appropriate actions

4. **Seeing Things In the Mind's Eye**: Organizes and processes symbols, pictures, graphs, objects, and other information.
   a. understands both written and verbal instructions

5. **Knowing How to Learn**: Use efficient learning techniques to acquire and apply new knowledge and skills
   a. learns to anticipate examination questions, categorize, describe, and explain efficient learning techniques
   b. uses these sequential skills to support mastery of new skills

6. **Reasoning**: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. applies rules of word choice in composing essays

C. **Personal Qualities**: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility**: Exerts a high level of effort and perseveres towards goal attainment
   a. attends class, meets deadlines, and writes legibly
   b. develops an understanding that in order to be successful in English, preparation for the day's work is necessary
   c. accepts the responsibility for active participation in class

2. **Self-Esteem**: Believes in own self-worth and maintains a positive view of self
   a. learns to take pride in his or her work through positive reinforcement
   b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal

3. **Sociability**: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. participate in small group discussions
   b. assist students with special needs as a peer mentor

4. **Self-Management**: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. maintain a record of academic achievement and monitor progress
   b. accept the responsibility for self-management
   c. set goals and complete assigned tasks
d. monitors personal goal progress

5. Integrity/Honesty: Chooses ethical courses of action
   a. accept the responsibility for own actions
   b. exhibits personal honesty at all times
   c. accept the challenge of doing own work in class and on outside assignments
   d. accept the responsibility of doing own work on examinations
   e. understand the consequences of unethical behavior
GENERAL EDUCATION COURSE SYLLABUS

COLLEGE ALGEBRA
COURSE SYLLABUS

COLLEGE ALGEBRA

Lecture hours/week: 4  
Lab hours/week: 0  
Credit hours: 3

COURSE DESCRIPTION:

A study of quadratics; polynomial, rational, logarithmic and exponential functions; systems of equations; progressions; sequences and series; matrices and determinants.

PREREQUISITE: Intermediate Algebra or equivalent as determined by Math Placement Exam

REQUIRED COURSE MATERIALS:


Supplies: 
- Textbook
- Notebook paper
- Graph paper (optional)
- Pencils
- Ruler
- Scientific Calculator
- Scantron form 882 w/100 answers

COURSE OBJECTIVES:

Upon completion of this course, the student will:
1. Solve linear, quadratic and absolute value equations and inequalities in one variable;
2. Define relation, function and inverse functions and graph linear, quadratic, polynomial and rational functions;
3. Solve systems of linear and nonlinear equations with two and three variables;
4. Define a matrix, perform operations with matrices, and find the inverse of a matrix;
5. Write the equation of a circle or parabola given specific characteristics and graph of both of these;
6. Determine the number of and nature of the roots of a polynomial equation and solve for them using synthetic division;
7. Define exponential and logarithmic functions, determine their properties and graphs and solve equations involving exponential and logarithmic functions;
8. Define the concepts of sequence and series and develop the properties for arithmetic, geometric and binomial series.
## COURSE OUTLINE:

<table>
<thead>
<tr>
<th>Topics</th>
<th>Contact Hrs.</th>
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<tbody>
<tr>
<td>Introduction to College Algebra</td>
<td>1</td>
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<tr>
<td>Algebraic Equations and Inequalities</td>
<td>8</td>
</tr>
<tr>
<td>A. Equations and Applications</td>
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<tr>
<td>1. Linear</td>
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<td>2. Quadratic</td>
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<td>3. Other</td>
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<tr>
<td>a. Higher Degree</td>
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<tr>
<td>b. Radical</td>
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<tr>
<td>c. Rational</td>
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<tr>
<td>d. Absolute Value</td>
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<tr>
<td>B. Complex Numbers</td>
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<tr>
<td>C. Inequalities</td>
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<tr>
<td>1. Linear</td>
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<td>2. Quadratic</td>
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<td>3. Cubic</td>
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<td>4. Rational</td>
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<td>5. Absolute value</td>
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<tr>
<td>Functions and Graphs</td>
<td>9</td>
</tr>
<tr>
<td>A. The Cartesian Plane</td>
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<tr>
<td>B. Graphing an Equation</td>
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<td>C. Lines in the Plane</td>
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<td>D. Functions</td>
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<tr>
<td>1. Definition and Notation</td>
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<td>2. Graphs - include parabola</td>
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<tr>
<td>3. Combinations</td>
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<tr>
<td>a. Operations</td>
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<td>b. Composition</td>
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<tr>
<td>4. Inverse</td>
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<tr>
<td>Polynomial and rational Functions: Graphs and Zeros</td>
<td>10</td>
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<tr>
<td>A. Graphing and Finding Zeros</td>
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<tr>
<td>1. Quadratic</td>
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<td>2. Higher Degree</td>
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<tr>
<td>B. Polynomial and Synthetic Division</td>
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<td>C. Real Zeros</td>
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<tr>
<td>1. Descarte's Rule of Signs</td>
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<td>2. Rational Zero Test</td>
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<tr>
<td>3. Bounds</td>
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<td>D. Complex Zeros and the Fundamental Theorem of Algebra</td>
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<tr>
<td>E. Approximation Techniques for Zeros</td>
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<tr>
<td>F. Graphing Rational Functions</td>
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<tr>
<td>Exponential and Logarithmic Functions</td>
<td>7</td>
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<tr>
<td>A. Exponential Functions</td>
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<tr>
<td>1. Graphing</td>
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<td>2. Natural Base e</td>
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</tbody>
</table>

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### Applications

**B. Logarithmic Functions**
1. Graphing
2. Natural Logarithmic Functions
3. Change of Base

**C. Properties of Logarithms**

**D. Solving Exponential and Logarithmic Equations**

**E. Applications**

### Systems of Equations and Matrices

**A. Systems and Equations in Two Variables**
1. Graphing
2. Substitution
3. Elimination

**B. Systems of Linear Equations in more than Two Variables**
1. Elimination in Row - echelon form
2. Gaussian Elimination
3. Gauss-Jordan Elimination

**C. Operations with Matrices**

**D. The Inverse of a Matrix**

### Sequence and Series

**A. Sequence and Summation**

**B. Arithmetic Sequences**

**C. Geometric Sequences and Series**

**D. The Binomial Theorem**

### Final Exam

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**COURSE OBJECTIVES: SCANS COMPETENCIES**

The Secretary’s Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its “AMERICA 2000 REPORT” that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

### I. COMPETENCIES

**A. Resources: Identifies, organizes, plans, and allocates resources**
1. follows a schedule to complete assigned tasks on time
2. provide a self-evaluation of performance based on the time and quality of work

---

Total Lecture Hours  48
3. assesses own skills to determine when to get extra help or use the math lab with videos, computers, tutorials, etc.

**B. Interpersonal: Works with others**
1. participates in classroom dialogue, contributing to group effort in problem solving
2. works well with all members of the class
3. communicates ideas on take-home exams to justify answers

**C. Information: Acquires and uses information**
1. apply mathematical solutions to problems assigned
2. organize and maintain lecture notebook and assignment notebook
3. communicates/interprets information by participating in classroom dialogue
4. uses 050 computer tutorials as necessary
5. acquires math material from the text, videos, and computers
6. interprets information in problem solving situations on homework, lab worksheets, and exams
7. uses the University of Arizona software to assist in graphing functions, solving equations, evaluating sequences, and performing matrix operations

**D. Systems: Understands complex inter-relationships**
1. understands systems:
   a. applies a systematic approach to solving mathematical problems
   b. develops an understanding of mathematical system complexity with applications to algebra, geometry, and trigonometric equation solving
   c. operates within the organizational system of the class procedures to fulfill the requirements to pass the course
   d. understands the technological uses of the calculator and computer to know when and how to use them efficiently to complete algebra problems
2. monitors and corrects performance:
   a. monitors own progress in the class and understanding of math concepts to know when to seek additional help
   b. decides what changes must occur in order to improve performance in algebra
   c. assesses learning style and adjusts study skills to enhance performance
3. interprets and designs systems:
   a. student evaluations are requested and may provide recommendations for changes in teaching methods to enhance student understanding of mathematical concepts

**E. Technology: Works with a variety of technologies**
1. selects technology:
   a. uses computers and graphing calculators to complete lab assignments, homework, and examinations
2. applies technology to task:
   a. selects the appropriate technological tools to solve assigned problems
   b. selects appropriate methods to solve mathematical problems
c. understands the applications and capabilities of technological tools for problem solving relevant to this course
d. applies mathematical problem solving skills using a scientific calculator

3. maintains and troubleshoots equipment:
a. maintains personal calculators

II. FOUNDATION SKILLS
A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks.

1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
   a. interprets word problems, tables, graphs, and drawings to identify presented problem(s)
   b. reads and studies textbook, available tutorials, and video tapes
   c. uses available tutorials in the laboratory as needed
   d. follows a daily schedule to maintain appropriate time-line for completing homework, lab exercises, and exams

2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. communicates problem solving skills by solving mathematical problems in writing using presented information
   b. maintains a lecture notebook
   c. completes all written assignments
   d. completes examinations, including definitions, problem solving, and concept explanations
   e. submits written responses to chapter question assignments

3. Arithmetic/Mathematics: Perform basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
   a. adds, subtracts, multiplies, and divides all numbers in the complex number system, algebraic expressions, equations, and functions
   b. analyzes and graphs functions and equations
   c. solves application problems using algebraic, analytic, and geometric techniques
   d. solves equations algebraically and geometrically
   e. identifies functions and their graphs

4. Listening: Receives, attends to, interprets, and responds to verbal messages and other cues
   a. listens to lectures and takes notes
   b. listens to instructions for homework, laboratory, and examination assignments
   c. listens to questions and responses of students participating in class discussions
   d. interpret and assimilate video instruction
   e. observe laboratory demonstrations
5. Speaking: Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organize ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required mathematical skill
   d. communicates with peers
   e. assists others and participates in group activities

B. Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. Creative Thinking: Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the “brain-storming” process
   c. participates in group problem solving process
   d. practices the team approach to problem solving

2. Decision Making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. identifies actions required to accomplish personal goals
   c. selects specific math applications

3. Problem Solving: Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility
   e. solves mathematical problems using an organized step-by-step approach

4. Seeing Things In the Mind's Eye: Organizes, and processes symbols, pictures, graphs, objects, and other information
   a. prepares sketches, graphs, and tables to assist in understanding word problems
   b. interprets word problems
   c. assimilates arithmetic problems in class
   d. interprets non-verbal communication in the classroom
   e. understands both written and verbal instructions

5. Knowing How to Learn: Use efficient learning techniques to acquire and apply new knowledge and skills
   a. recognizes relevant information to solve specific problem(s)
   b. identifies “given” data and applies appropriate equations
   c. demonstrates mastery of basic math skills
   d. uses sequential math skills to support mastery of new skills
   e. thinks through the problem mentally before selecting appropriate formula(e)/equation(s)
   f. determines own learning style in order to apply proper skills to enhance learning
g. uses previously acquired knowledge to assist in learning new concepts

6. **Reasoning:** *Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem*
   a. understands that the ability to apply mathematics requires "practice"
   b. understands the necessity to perform math as applied to specific technology
   c. selects appropriate mathematical application after considering all given data
   d. understands and applies the concepts/applications of theorems and algebraic rules
   e. builds functions and equations describing the relationship between two or more quantities

C. **Personal Qualities:** *Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.*

1. **Responsibility:** *Exerts a high level of effort and perseveres towards goal attainment*
   a. develops an understanding that in order to be successful in mathematics, preparation for the day's work is necessary
   b. develops an understanding that classroom attendance is essential for success in the course
   c. accepts the responsibility for active participation in class

2. **Self-Esteem:** *Believes in own self-worth and maintains a positive view of self*
   a. learns to take pride in his or her work through positive reinforcement
   b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal
   c. understands that an individual with a positive attitude and the belief in their own abilities will systematically seek solutions and be a valuable employee
   d. accepts shared common goals of the class and views each individual as an asset to the group

3. **Sociability:** *Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings*
   a. assist classmates in improving mathematical skills
   b. assist students with special needs as a peer mentor
   c. share laboratory resources
   d. assist classmates in understanding math applications in a group
   e. conducts his or herself in class so as to not intimidate or ostracize others
   f. uses appropriate language in class

4. **Self-Management:** *Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control*
   a. maintain a record of academic achievement (individual grade book)
   b. accept the responsibility for self-management
c. set goals and complete assigned tasks
d. seeks additional help from the instructor or math lab as needed

5. **Integrity/Honesty: Chooses ethical courses of action**
   
a. accept the responsibility for own actions
b. exhibit personal honesty at all times
c. accept the challenge of doing your own work in the laboratory, during examination, and on outside assignments
d. understand the consequences of unethical behaviors
Machine Tool Advanced Skills Technology Program

MAST

GENERAL EDUCATION COURSE SYLLABUS

PLANE TRIGONOMETRY
MAST PROGRAM
COURSE SYLLABUS
PLANE TRIGONOMETRY

Lecture hours/week: 4  Lab hours/week: 0  Credit hours: 3

COURSE DESCRIPTION:

Topics in trigonometric functions, right triangles, trigonometric identities, radian measure, graphs of periodic functions, and oblique triangles.

PREREQUISITE: College Algebra

REQUIRED COURSE MATERIALS:


Supplies: Notebook Paper
          Pencils
          Scientific Calculator
          Scantron form 882 w/100 answers

COURSE OBJECTIVES:

Upon completion of this course, the student will:
1. Find the distance between two points.
2. Define the trigonometric functions.
3. Solve right triangles.
4. Find the function values of any angle.
5. State and use fundamental relationships of trigonometric functions.
6. Graph trigonometric functions.
7. Verify trigonometric identities.
8. Solve trigonometric equations.
9. Graph the inverse sine, cosine, and tangent functions.
11. Perform operations on the set of complex numbers in both rectangular and polar form.
12. Graph complex numbers
13. Solve applied problems using vectors, radian measure, linear and angular velocity, arc length, area of a sector, trigonometric equations, and inverse functions.

COURSE OUTLINE:

<table>
<thead>
<tr>
<th>Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to College Algebra</td>
<td>1</td>
</tr>
<tr>
<td>The Trigonometric Functions</td>
<td>11</td>
</tr>
</tbody>
</table>
A. Basic Terms of Trigonometry
B. Definitions of the Trigonometric Functions
C. Trigonometric Functions of Acute Angles
D. Trigonometric Functions of Special Angles
E. Using Reference Angles and the Trigonometric Tables
F. Solving Right Triangles
G. Applications of Right Triangles

Radian Measure
A. Radian Measure Conversions
B. Formulae for Arc Length and Area of a Sector
C. Linear and Angular Velocity Formulae
D. Circular Functions of Real Numbers

Graphs of Trigonometric Functions
A. Graphs of the Sine and Cosine Functions
B. Horizontal Translations: Phase Shift
C. Graphs of other Trigonometric Functions

Trigonometric Identities
A. Fundamental Identities
B. Verifying Trigonometric Identities
C. Identities Involving Sums and Differences of Two Angles
D. Double and Half-Angle Identities

Inverse Trigonometric Functions and Trigonometric Equations
A. Inverse Functions
B. Inverse Trigonometric Functions
C. Trigonometric Equations
D. Inverse Trigonometric Equations

Oblique Triangles and Vectors
A. Law of Sines
B. The Ambiguous Case: SSA
C. Law of Cosines
D. Vector Applications

Complex Numbers and Polar Coordinates
A. Operations with Complex Numbers
B. Trigonometric Form of a Complex Number
C. Product and Quotient Theorems
D. Powers and Roots of Complex Numbers

Final Exam

Total Lecture Hours 48

COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.
The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES

A. **Resources:** Identifies, organizes, plans, and allocates resources
   1. follows a schedule to complete assigned tasks on time
   2. provide a self-evaluation of performance based on the time and quality of work and makes necessary adjustments

B. **Interpersonal:** Works with others
   1. encouraged to work in groups to more efficiently diagnose computational errors and sharing/reinforcing conceptual understanding of all mathematics
   2. works well with all members of the class from diverse cultural backgrounds

C. **Information:** Acquires and uses information
   1. encouraged to read the text, maintain a lecture notebook, and work math problems using the information acquired
   2. respond to instructor inquiries and questions on examinations
   3. communicates/interprets information by participating in classroom dialogue
   4. uses 050 computer tutorials as necessary
   5. uses scientific calculators and computer software to process information and perform calculations

D. **Systems:** Understands complex inter-relationships
   1. applies a systematic approach to solving mathematical problems
   2. develops an understanding of mathematical system complexity with applications to algebra, geometry, and trigonometric equation solving

E. **Technology:** Works with a variety of technologies
   1. selects appropriate calculator and tutorial software to meet the needs of the course
   2. selects appropriate methods to solve mathematical problems
   3. applies mathematical problem solving skills using a scientific calculator

II. FOUNDATION SKILLS

A. **Basic Skills:** Reads, writes, performs arithmetic and mathematical operations, listens and speaks.
   1. **Reading:** Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
      a. interprets word problems, tables, graphs, and drawings of trigonometric functions to identify presented problem(s) and to determine period and amplitude functions
      b. reads and studies textbook, available tutorials, and video tapes
      c. uses available tutorials in the laboratory as needed
      d. follows a daily lecture schedule to maintain an appropriate time-line
   2. **Writing:** Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
      a. communicates problem solving skills by solving mathematical problems in writing using presented information
      b. generates graphs from trigonometric equations
      c. completes all written assignments
3. **Arithmetic/Mathematics:** Perform basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
   a. performs applied computations of arithmetic, algebra, geometry, and trigonometry
   b. solves equations and computes characteristics of and solves triangles
   b. selects appropriate formulae to solve specific mathematical problems

4. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
   a. assimilate classroom instruction
   b. interpret and assimilate video and tutorial instruction
   c. observe laboratory demonstrations
   d. seek and receive individualized instruction in the laboratory
   e. participates as an active listener in classroom instruction

5. **Speaking:** Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organize ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required mathematical skill
   d. communicates with peers

B. **Thinking Skills:** Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking:** Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the “brain-storming” process
   c. participates in group problem solving process
   d. practices the team approach to problem solving

2. **Decision Making:** Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. selects the correct procedure and formulae to solve mathematical problems

3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. applies algebraic skills to solve problems
   b. makes daily accommodations to stay on schedule
   c. seeks additional instruction/clarification for assignment completion
   d. balances social and academic life/responsibilities
   e. accepts responsibility

4. **Seeing Things In the Mind's Eye:** Organizes, and processes symbols, pictures, graphs, objects, and other information
   a. prepares sketches, graphs, and tables to assist in understanding word problems
   b. interprets word problems
   c. assimilates arithmetic problems in class
   d. interprets non-verbal communication in the classroom
5. **Knowing How to Learn**: Use efficient learning techniques to acquire and apply new knowledge and skills
   a. recognizes relevant information to solve specific problem(s)
   b. identifies “given” data and applies appropriate equations
   c. demonstrates mastery of basic math skills
   d. uses sequential math skills to support mastery of new skills
   e. thinks through the problem mentally before selecting appropriate formula(e)/equation(s)

6. **Reasoning**: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. understands that the ability to apply mathematics requires “practice”
   b. understands the necessity to perform math as applied to specific technology
   c. selects appropriate mathematical application after considering all given data

C. **Personal Qualities**: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility**: Exerts a high level of effort and perseveres towards goal attainment
   a. develops an understanding that in order to be successful in mathematics, preparation for the day’s work is necessary
   b. develops an understanding that classroom attendance is essential for success in the course
   c. accepts the responsibility for active participation in class

2. **Self-Esteem**: Believes in own self-worth and maintains a positive view of self
   a. learns to take pride in his or her work through positive reinforcement
   b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal
   c. understands that an individual with a positive attitude and the belief in their own abilities will systematically seek solutions and be a valuable employee
   d. accepts shared common goals of the class and views each individual as an asset to the group

3. **Sociability**: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. assist classmates in improving mathematical skills
   b. assist students with special needs as a peer mentor
   c. share laboratory resources
   d. assist classmates in understanding math applications in a group

4. **Self-Management**: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. maintain a record of academic achievement (individual grade book)
   b. accept the responsibility for self-management
   c. set goals and complete assigned tasks

5. **Integrity/Honesty**: Chooses ethical courses of action
   a. accept the responsibility for own actions
b. exhibit personal honesty at all times

c. accept the challenge of doing your own work in the laboratory, during examination, and on outside assignments

d. understand the consequences of unethical behaviors
Machine Tool Advanced Skills Technology Program

MAST

GENERAL EDUCATION COURSE SYLLABUS

OCCUPATIONAL MATHEMATICS
MAST PROGRAM
COURSE SYLLABUS
OCCUPATIONAL MATHEMATICS

Lecture hours/week: 3  Lab hours/week: 2  Credit hours: 4

COURSE DESCRIPTION:

This course includes basic English and Metric units of measurement, geometric principles, solution of basic algebraic equations, and solution of right triangles. Problems from specific occupational areas will be stressed.

PREREQUISITES: As determined by the MATH placement test.

REQUIRED COURSE MATERIALS:


Supplies: #2 Pencils
Notebook
Calculator: any "Scientific" calculator

COURSE OBJECTIVES:

Upon completion of this course, the student will:
1. understand and use basic units of English and Metric systems of measurement, as well as converting from one type measurement to another;
2. perform basic algebraic operations;
3. evaluate formulae and manipulate formula for any variable;
4. recognize plane geometric shapes and some geometric applications to specific vocations; and
5. solve right triangle problems using basic trigonometry.

LECTURE OUTLINE:

<table>
<thead>
<tr>
<th>Lecture Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and Review</td>
<td>3</td>
</tr>
<tr>
<td>Linear Measurements</td>
<td>2</td>
</tr>
<tr>
<td>a. English Units</td>
<td></td>
</tr>
<tr>
<td>b. Metric units</td>
<td></td>
</tr>
<tr>
<td>c. Conversions</td>
<td></td>
</tr>
<tr>
<td>Fundamentals of Algebra</td>
<td>6</td>
</tr>
<tr>
<td>a. Evaluation; Absolute Value</td>
<td></td>
</tr>
</tbody>
</table>
b. Signed Numbers:
   Addition, Subtraction, Multiplication, Division

c. Laws of Exponents

d. Algebraic Expressions:
   Addition, Subtraction, Multiplication, Division

Equations and Formulae
a. Solving Equations and Formulae
b. Ratio and Proportion
c. Writing Equations

Geometric Shapes
a. Points, Lines, Angles
b. Triangles
c. Other Polygons and Circles
d. Area and Volume Formula

Trigonometry
a. Definitions of Trigonometric Functions
b. Trigonometric Tables
c. Solution of Right Triangles
d. Applications

TESTING

Total Lecture Hours 36

LAB OUTLINE:

<table>
<thead>
<tr>
<th>Lab Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rounding Decimals</td>
<td>3</td>
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<tr>
<td>Expressing Fractions as Decimals and Decimals as Fractions Review</td>
<td></td>
</tr>
<tr>
<td>Conversions between English and Metric units of measure</td>
<td>1</td>
</tr>
<tr>
<td>Applications of Evaluating Algebraic Expressions</td>
<td>6</td>
</tr>
<tr>
<td>Signed Number Drills</td>
<td></td>
</tr>
<tr>
<td>Laws of Exponents</td>
<td></td>
</tr>
<tr>
<td>Scientific Notation</td>
<td></td>
</tr>
<tr>
<td>Review of Algebraic Expression</td>
<td></td>
</tr>
<tr>
<td>Solving Equations with Combined Operations</td>
<td>6</td>
</tr>
<tr>
<td>Rearranging Formulae</td>
<td></td>
</tr>
<tr>
<td>Writing Equations</td>
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<tr>
<td>Inverse Proportion</td>
<td></td>
</tr>
<tr>
<td>Review of Equations and Formulae</td>
<td></td>
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<tr>
<td>Angles: Minutes to Decimal parts and vice versa</td>
<td>6</td>
</tr>
<tr>
<td>Applications of Triangles and other Polygons</td>
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<tr>
<td>Applications of Circles</td>
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<tr>
<td>Area and Volume Formulae</td>
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<tr>
<td>Interpolation</td>
<td>2</td>
</tr>
<tr>
<td>Applications of Right Triangles</td>
<td></td>
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</tbody>
</table>

Total Lab Hours 24
COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. Resources: Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks on time
      2. provide a self-evaluation of performance based on the time and quality of work
   B. Interpersonal: Works with others
      1. participates in classroom dialogue, contributing to group effort in problem solving
      2. works well with all members of the class.
   C. Information: Acquires and uses information
      1. apply mathematical solutions to problems assigned
      2. organize and maintain lecture notebook and assignment notebook
      3. communicates/interprets information by participating in classroom dialogue
      4. uses 050 computer tutorials as necessary
   D. Systems: Understands complex inter-relationships
      1. applies a systematic approach to solving mathematical problems
      2. develops an understanding of mathematical system complexity with applications to algebra, geometry, and trigonometric equation solving
   E. Technology: Works with a variety of technologies
      1. selects appropriate calculator to meet the needs of the course
      2. selects appropriate methods to solve mathematical problems
      3. selects appropriate measurement procedures
      4. applies mathematical problem solving skills using a scientific calculator

II. FOUNDATION SKILLS
   A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks.
      1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
         a. interprets word problems, tables, graphs, and drawings to identify presented problem(s)
         b. reads and studies textbook, available tutorials, and video tapes
         c. uses available tutorials in the laboratory as needed
2. **Writing:** Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. communicates problem solving skills by solving mathematical problems in writing using presented information
   b. maintains a lecture notebook
   c. completes all written assignments

3. **Arithmetic/Mathematics:** Perform basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
   a. performs applied computations of arithmetic, algebra, geometry, and trigonometry
   b. performs applied computations of measurement conversions

4. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
   a. assimilate classroom instruction
   b. interpret and assimilate video instruction
   c. observe laboratory demonstrations
   d. seek and receive individualized instruction in the laboratory
   e. participates as an active listener in classroom instruction

5. **Speaking:** Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organize ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required mathematical skill
   d. communicates with peers

B. **Thinking Skills:** Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking:** Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the “brain-storming” process
   c. participates in group problem solving process
   d. practices the team approach to problem solving

2. **Decision Making:** Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies personal goals
   b. selects specific math applications

3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility

4. **Seeing Things In the Mind's Eye:** Organizes, and processes symbols, pictures, graphs, objects, and other information
   a. prepares sketches, graphs, and tables to assist in understanding word problems
b. interprets word problems
c. assimilates arithmetic problems in class
d. interprets non-verbal communication in the classroom

5. **Knowing How to Learn:** Use efficient learning techniques to acquire and apply new knowledge and skills
   a. recognizes relevant information to solve specific problem(s)
   b. identifies “given” data and applies appropriate equations
c. demonstrates mastery of basic math skills
d. uses sequential math skills to support mastery of new skills
e. thinks through the problem mentally before selecting appropriate formula(e)/equation(s)

6. **Reasoning:** Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. understands that the ability to apply mathematics requires “practice”
b. understands the necessity to perform math as applied to specific technology
c. selects appropriate mathematical application after considering all given data

C. **Personal Qualities:** Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility:** Exerts a high level of effort and perseveres towards goal attainment
   a. develops an understanding that in order to be successful in mathematics, preparation for the day’s work is necessary
   b. develops an understanding that classroom attendance is essential for success in the course
c. accepts the responsibility for active participation in class

2. **Self-Esteem:** Believes in own self-worth and maintains a positive view of self
   a. learns to take pride in his or her work through positive reinforcement
   b. sees himself or herself as an asset to the class through continued contributions to the group and a shared common goal
c. understands that an individual with a positive attitude and the belief in their own abilities will systematically seek solutions and be a valuable employee
d. accepts shared common goals of the class and views each individual as an asset to the group

3. **Sociability:** Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. assist classmates in improving mathematical skills
   b. assist students with special needs as a peer mentor
   c. share laboratory resources
d. assist classmates in understanding math applications in a group

4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. maintain a record of academic achievement (individual grade book)
b. accept the responsibility for self-management
c. set goals and complete assigned tasks

5. **Integrity/Honesty: Chooses ethical courses of action**
   a. accept the responsibility for own actions
   b. exhibit personal honesty at all times
   c. accept the challenge of doing your own work in the laboratory, during examination, and on outside assignments
   d. understand the consequences of unethical behaviors
Machine Tool Advanced Skills Technology Program

GENERAL EDUCATION COURSE SYLLABUS

ELEMENTARY PHYSICS
MAST PROGRAM
COURSE SYLLABUS
ELEMENTARY PHYSICS

Lecture hours/week: 4   Lab hours/week: 0   Credit hours: 3

COURSE DESCRIPTION:

An algebra-level, problem solving course. Presents special topics of measurements and the classical physics of mechanics, energy, and motion with emphasis on fundamental concepts, problem solving, notation and units.

PREREQUISITE: Intermediate Algebra or above

REQUIRED COURSE MATERIALS:


Supplies: Scientific Calculator
          Notebook paper
          Metric ruler
          Protractor (1 degree increments)
          Graph paper
          Pencils

COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:
1. demonstrate comprehension of ideas and concepts of physics of mechanics, energy, and motion;
2. demonstrate the use of prerequisite mathematical skills and application of concepts in problem solving;
3. apply problem solving techniques and quantitatively solve physics problems in topics of mechanics, energy;
4. evaluate the assumptions and results of an analytically solved problem in terms of realistic expectations of experimental agreement.

LECTURE OUTLINE:

<table>
<thead>
<tr>
<th>Lecture Topics</th>
<th>Contact Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Mathematics and Measurement</td>
<td>4</td>
</tr>
<tr>
<td>A. Systems of Units and Measure</td>
<td></td>
</tr>
</tbody>
</table>

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B. Conversion of units and physical dimensions
C. Significant figures and Scientific Notation
D. Coordinate systems and Geometry review

Forces and Vectors
A. Vector and scaler quantities
B. Addition of vectors and resultant force
C. Right Triangles and Sine, Cosine, and Tangent ratios
D. Vector components and component addition

Equilibrium and Friction
A. Newton's First and Third Laws of Motion
B. Free-Body Diagrams
C. Equilibrium of concurrent force systems
D. Equilibrium and vector components
E. Friction and Normal Force

Torque and Rotational Equilibrium
A. Moment Arms
B. Torque due to a force
C. Resultant Torque and Rotational Equilibrium
D. Center of Gravity

Uniformly Accelerated Motion
A. Speed and Velocity
B. Accelerated Motion
C. Linear Equations and Motion
D. Solution of accelerated problems
E. Gravity and freely falling bodies

Force and Acceleration
A. Newton's Second law of Motion
B. Relationship between Weight and Mass
C. Application of Newton's Second Law to Single Body Problems
D. Problem Solving Techniques

Energy and Momentum
A. Work and Resultant Work
B. Work and Kinetic Energy
C. Potential Energy
D. Conservation of Energy
E. Power
F. Impulse and Momentum
G. Law of Conservation of Momentum

Rotational Motion
A. Motion in a Circular Path
B. Centripetal Acceleration
C. Centripetal Force
D. Friction and the Centripetal Force

Exams and Review

Total Lecture Hours 48
The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. Resources: Identifies, organizes, plans, and allocates resources
      1. follows a schedule to complete assigned tasks on time
      2. uses feedback to assess progress in class
      3. uses peer/instructor resources to reach identified goals
      4. assesses personal strength and areas of improvement and develops appropriate career goals
   B. Interpersonal: Works with others
      1. works with peers through informal study groups to accomplish assigned tasks
      2. works well with individuals from a variety of ethnic, social, gender, and educational backgrounds to complete assigned tasks
   C. Information: Acquires and uses information
      1. engages in physics problem solving activities
      2. uses critical thinking skill in evaluating physics problems
      3. selects and analyzes information and communicates the results to others using written and graphic methods

II. FOUNDATION SKILLS
   A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks.
      1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
         a. reads and studies textbook
         b. completes reading assignments
         c. interprets reading assignments and physics problems
         d. interprets/follows class schedule
      2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
         a. maintains a lecture notebook
         b. submits written responses to chapter question assignments
      3. Arithmetic/Mathematics: Perform basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
a. applies problem solving techniques to quantitatively solve physics problems in topics of mechanics and energy
b. evaluates the assumptions and results of an analytically solved problem in terms of realistic expectations of experimental agreement.

4. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
   a. receives/interprets verbal messages via didactic presentations
   b. responds to verbal messages
   c. confirms verbal message interpretations both in and out of class
   d. makes appropriate behavior responses to verbal messages

5. **Speaking:** Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organize ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required skill
   d. communicates effectively with peers

B. **Thinking Skills:** Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking:** Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the brainstorming process
   c. participates in group problem solving

2. **Decision Making:** Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. identifies actions required to accomplish personal goals

3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. accepts responsibility

4. **Seeing Things In the Mind's Eye:** Organizes, and processes symbols, pictures, graphs, objects, and other information
   a. visually, using symbols, graphs, and pictures, describes physics problems presented
   b. uses the problem solving process to identify given data and unknown data
   c. selects appropriate problem solving strategies including appropriate math formulae

5. **Knowing How to Learn:** Use efficient learning techniques to acquire and apply new knowledge and skills
   a. uses techniques for creative thinking
   b. develops strategies for problem solving

6. **Reasoning:** Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. performs critical thinking when solving physics problems
C. **Personal Qualities:** Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility:** Exerts a high level of effort and perseveres towards goal attainment
   a. accepts responsibility for behavior and develops a proactive attitude

2. **Self-Esteem:** Believes in own self-worth and maintains a positive view of self
   a. provided with positive feedback and encouragement
   b. provided with individual mentoring and counseling

3. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. performs personal goal setting activities
   b. assesses self and personal goals and monitors individual progress

4. **Integrity/Honesty:** Chooses ethical courses of action
   a. accepts the responsibility for own actions
   b. meets specific criteria standards to successfully complete the course
   c. demonstrates honesty and integrity
   d. encouraged to accept ethical and honest course of action set by example
Machine Tool Advanced Skills
Technology Program

MAST

GENERAL EDUCATION COURSE SYLLABUS

HUMAN RELATIONS
MAST PROGRAM
COURSE SYLLABUS
HUMAN RELATIONS

Lecture hours/week: 2 Lab hours/week: 2 Credit hours: 3

COURSE DESCRIPTION:

A human relations course that deals with the dynamics involved in developing and maintaining positive/productive interpersonal and work relationships. Experiential group exercises give students an opportunity to immediately apply and practice the learned skills.

PREREQUISITES: NONE

REQUIRED COURSE MATERIALS:

Recommended

Supplies: Scantron Answer Sheets
Chatsworth Cards (Dr. Doody Only)
2 pencils (#2)

COURSE OBJECTIVES:

Upon completion of the course, the student will:
1. Demonstrate an understanding of the factors that help and hinder effective interactions in their work and personal environments;
2. Demonstrate knowledge of the skills necessary for a cooperative work environment that facilitates the attainment of personal and organizational goals;
3. Demonstrate the skills necessary to cope with the complex ever-changing work and social environments; and
4. Demonstrate an increased understanding of the behaviors that will help them become successful in predicting, understanding, and influencing the outcome of their interactions with others.

LECTURE OUTLINE

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COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.
The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES
   A. **Resources: Identifies, organizes, plans, and allocates resources**
      1. follows a schedule to complete assigned tasks on time
      2. assesses personal strengths and weaknesses and develops appropriate career goals
   B. **Interpersonal: Works with others.**
      1. works cooperatively with others and contributes to the group process with ideas, suggestions and effort
      2. provides feedback to peers and instructors
      3. demonstrates good human relation skills in interpersonal interactions
      4. communicates thoughts, feelings, and ideas, and when appropriate, responsibly challenges existing procedures, policies, or authority
      5. uses authority appropriately
      6. resolves conflict
      7. works well with individuals from a variety of ethnic, social and educational backgrounds in completing assigned tasks
   C. **Information: Acquires and uses information**
      1. solves problems
      2. uses critical thinking skills in making decisions
      3. selects and analyzes information and communicates the results to others using oral, written, graphics, pictorial, or multimedia methods
   D. **Systems: Understands complex inter-relationships**
      1. demonstrates knowledge of organizational structure and uses the chain of command

II. FOUNDATION SKILLS
   A. **Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks.**
      1. **Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules**
         a. reads and studies textbook
         b. completes reading assignments
         c. interprets reading assignments
         d. interprets/follows class schedule
      2. **Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents, such as letters, directions, manuals, and flow charts**
         a. completes written assignments
         b. takes class notes
      3. **Listening: Receives, attends to, interprets, and responds to verbal messages and other cues**
         a. receives/interprets verbal messages via didactic presentations
         b. responds to verbal messages
         c. confirms verbal message interpretations both in and out of class
         d. makes appropriate behavior response to verbal messages
4. **Speaking**: Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organizes ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required skill
   d. communicates effectively with peers

B. **Thinking Skills**: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.

1. **Creative Thinking**: Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the brainstorming process
   c. participates in group problem solving
   d. practices the team approach to problem solving

2. **Decision Making**: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. generates a personal and career development plan
   b. assesses personal growth and development areas
   c. generates a list of career alternatives and chooses the most appropriate career choices based upon personal attributes
   d. identifies actions required to accomplish personal goals

3. **Problem Solving**: Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility
   e. demonstrates a creative solution to a problem in writing

4. **Seeing Things In the Mind's Eye**: Organizes and processes symbols, pictures, graphs, objects, and other information
   a. participates in activities that encourage accepting responsibility for her/his career success
   b. participates in activities to strengthen belief in self-worth and encourage proactive/responsible choices

5. **Knowing How to Learn**: Use efficient learning techniques to acquire and apply new knowledge and skills
   a. develops techniques for adapting learning style for differences in teaching styles
   b. utilizes techniques for creative thinking
   c. develops strategies for problem solving

6. **Reasoning**: Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. performs self analysis of effective learning styles
   b. develops techniques for adapting learning style for differences in teaching styles
   c. performs critical thinking
   d. develops effective memory techniques
C. Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. Responsibility: Exerts a high level of effort and perseveres towards goal attainment
   a. develops stress management techniques that facilitate and encourage goal attainment
   b. accepts responsibility for behavior and develops a proactive attitude turning individual strengths into academic assets

2. Self-Esteem: Believes in own self-worth and maintains a positive view of self
   a. provided positive feedback/encouragement
   b. provided individual mentoring/counseling to support the educational process
   c. encouraged to develop interpersonal skills that will allow him/her to interact with confidence and project a positive self-image
   d. encouraged to practice positive peer feedback during daily exchange, in rotating diads; this activity is processed by the entire class and feelings are explored every class meeting

3. Sociability: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. participates in discussions of cultural diversity and its benefits
   b. discusses and demonstrates strategies for effective communication across cultures
   c. participates in discussions of gender diversity and sexism
   d. participates in discussions of different learning styles and disabilities
   e. encouraged to adopt an attitude of tolerance

4. Self-Management: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. assess self/personal goals and monitors individual progress
   b. performs goal setting activities
   c. conducts self assessment of performance on quizzes

5. Integrity/Honesty: Chooses ethical courses of action
   a. meets specific criteria standards to successfully complete the course
   b. demonstrates honesty and integrity while grading quizzes
   c. encouraged to accept ethical and honest courses of action by example
   d. situations and group activities provide opportunities to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills Technology Program

MAST

GENERAL EDUCATION COURSE SYLLABUS

COLLEGE SUCCESS SKILLS
MAST PROGRAM
COURSE SYLLABUS
COLLEGE SUCCESS SKILLS

Lecture hours/week: 1 Lab hours/week: 0 Credit hours: 1

COURSE DESCRIPTION:

This course is designed to provide students with the skills and knowledge to be successful in college. Topics include: diversity; self-management; tests taking; memory skills; reading techniques; critical thinking skills; and managing issues that face many college students.

PREREQUISITES: NONE

REQUIRED COURSE MATERIALS:


Supplies: 2 pencils (#2) 3 Ring Binder Pen

COURSE OBJECTIVES:

Upon completion of the course, the student will be able to:
1. understand how he/she is responsible for his/her own experience in college;
2. describe ways to create a successful and satisfying college experience;
3. describe methods to:
   a. improve ability to recall information;
   b. manage time more effectively;
   c. read a textbook with improved retention;
   d. take effective notes;
   e. prepare for and take tests;
   f. listen to a lecture for comprehension and;
   g. apply creative and critical thinking skills.
4. examine personal ideas and decisions regarding issues typically faced by college students.

COURSE OUTLINE

<table>
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<tr>
<th>Topics</th>
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<th>Contact Hrs.</th>
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<tr>
<td>What Am I Doing Here? Who Are All These People And Where Did They Come From?</td>
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COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES

A. Resources: Identifies, organizes, plans, and allocates resources
   1. follows a schedule to complete assigned tasks on time
   2. determine the initial cost of educational expenses and locates appropriate funding sources
   3. monitors and budgets the flow of money and uses strategies for increasing income and decreasing expenses
   4. assesses personal strengths and weaknesses and develops appropriate career goals

B. Interpersonal: Works with others
   1. functions as a member of the team in completing assignments
   2. provides feedback to peers as requested
   3. demonstrates good human relation skills and interpersonal interactions
   4. communicates thoughts, feelings and ideas when appropriate; and responsibly challenges existing procedures, policies or authority
   5. resolve conflict
   6. works well with individuals from a variety of ethnic, social or educational backgrounds in completing assigned tasks
C. **Information:** Acquires and uses information
   1. engages in problem solving activities
   2. uses a variety of memory techniques to recall information
   3. uses critical thinking skill in making decisions

D. **Systems:** Understands complex inter-relationships
   1. demonstrate knowledge of organizational structure and follows the chain of command

II. **FOUNDATION SKILLS**

A. **Basic Skills:** Reads, writes, performs arithmetic and mathematical operations, listens and speaks.
   1. **Reading:** Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
      a. reads and studies textbook
      b. completes reading assignments
      c. interprets reading assignments as demonstrated in classroom dialogue
      d. interprets and follows class schedule

2. **Writing:** Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. completes written assignments and quizzes
   b. creates an individually designed note-taking system
   c. takes class notes

3. **Arithmetic/Mathematics:** Perform basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
   a. completes a time-monitor plan

4. **Listening:** Receives, attends to, interprets, and responds to verbal messages and other cues
   a. receives/interprets verbal messages via didactic presentations
   b. responds to verbal messages
   c. confirms verbal message interpretations both in and out of class
   d. makes appropriate behavioral response to verbal messages

5. **Speaking:** Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organize ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required skill
   d. communicates with peers

B. **Thinking Skills:** Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.
   1. **Creative Thinking:** Generates new ideas
      a. develops new ideas for approaching problem solving
      b. participates in the brainstorming process
      c. participates in group problem solving
      d. practices the team approach to problem solving
2. **Decision Making:** Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   - a. generates a personal and career development plan
   - b. assesses areas for personal growth and develops a personal growth plan
   - c. generates a list of career alternatives and chooses the most appropriate career choices based upon a list of personal attributes
   - d. identifies actions required to accomplish personal goals

3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   - a. learns the steps to problem solving
   - b. participates in group and individual problem solving processes
   - c. makes daily accommodations to stay on schedule
   - d. seeks additional instruction/clarification for assignment completion
   - e. balances social and academic life responsibilities
   - f. accepts responsibility
   - g. demonstrates creative solutions to problems

4. **Seeing Things In the Mind’s Eye:** Organizes, and processes symbols, pictures, graphs, objects, and other information
   - a. participates in activities that encourage accepting responsibility for his/her career success
   - b. participate in activities to strengthen belief in self-worth and encourage proactive/responsible choices

5. **Knowing How to Learn:** Use efficient learning techniques to acquire and apply new knowledge and skills
   - a. utilize techniques for adapting learning styles to differences in teaching styles
   - b. performs assessment of individual learning style
   - c. practices memory techniques
   - d. practices reading improvement techniques
   - e. utilizes techniques for creative thinking
   - f. develops strategies for effective problem solving

6. **Reasoning:** Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   - a. performs self analysis of effective learning styles
   - b. utilizes techniques for effective creative thinking
   - c. develops strategies for effective problem solving

C. **Personal Qualities:** Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

1. **Responsibility:** Exerts a high level of effort and perseveres towards goal attainment
   - a. utilizes stress management techniques that facilitate goal attainment
   - b. accepts responsibility and develops a proactive attitude, turning individual strengths into academic assets

2. **Self-Esteem:** Believes in own self-worth and maintains a positive view of self
   - a. provides positive feedback/encouragement in groups
b. provides individual mentoring/counseling to support the educational process

c. encouraged to develop interpersonal skills that will allow him/her to interact with confidence and project a positive self-image

d. encouraged to practice positive peer feedback during daily exchanges

3. Sociability: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings

   a. participates in discussions of cultural diversity and its benefits
   b. discusses and demonstrates strategies for effective communication across cultures
   c. participates in discussions of gender diversity and sexism
   d. participates in discussions of different learning styles and disabilities
   e. encouraged to adopt an attitude of tolerance

4. Self-Management: Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control

   a. assesses self/personal goals and monitors individual progress
   b. performs goal setting activities
   c. conducts self-assessment on quizzes

5. Integrity/Honesty: Chooses ethical courses of action

   a. meets specific criteria standards to successfully complete the course
   b. demonstrate honesty and integrity while grading quizzes
   c. encouraged to accept ethical and honest course of action by example
   d. situations and group activities provide opportunity to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills Technology Program

MAST

GENERAL EDUCATION COURSE SYLLABUS

GENERAL PSYCHOLOGY
LECTURE TOPICS  

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M A S T  P R O G R A M  
C O U R S E  S Y L L A B U S  
G E N E R A L  P S Y C H O L O G Y  

Lecture hours/week:  4  Lab hours/week:  0  Credit hours:  3

COURSE DESCRIPTION:

A survey of the major topics in psychology, introducing the study of behavior and the factors that determine and affect behavior.

PREREQUISITES:  NONE

REQUIRED COURSE MATERIALS:

Recommended Textbooks:  

Supplies:  Scantron Answer Sheets

COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:
1. Differentiate between the popular image of psychology and the more accurate picture of the nature and content areas of psychology;
2. Recognize the major concepts, vocabulary, theories, research findings and principles of psychology;
3. Demonstrate application of the basic principles of psychological theory to real-life situations;
4. Have increased his/her understanding of similarities and differences among the people of the world as they relate to psychological principles, concepts, and issues;
5. Integrate overall knowledge of psychology by analyzing, synthesizing, and evaluating his/her own behavior to determine how well he/she is using and will continue to use the information acquired in this course to:
   a. make a more effective personal-social adjustment to his/her environment;
   b. develop a more open-minded attitude about human behavior; and
   c. become more tolerant of his/her own and others’ behavior by understanding some of its determinants.
Course Orientation
Introduction to Psychology Chapter 1

Biological Roots of Behavior
Biological Roots of Behavior Chapter 2
The Developing Person Chapter 3

Sensation, Perception, and Consciousness
Sensation and Perception Chapter 4
States of Consciousness Chapter 5

Learning, Memory, and Intelligence
Learning Chapter 6
Memory Chapter 7
Thinking and Intelligence Chapter 8

Motivation, Emotions, Stress and Health
Motivation Chapter 9
Emotions, Stress, and Health Chapter 10

Personality and Psychological Disorders
Personality Chapter 11
Psychological Disorders Chapter 12

Social Basis of Behavior
Social Diversity Chapter 15

Course Wrap-Up

Total Lecture Hours 48

COURSE OBJECTIVES: SCANS COMPETENCIES

The Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, has identified in its "AMERICA 2000 REPORT" that all students should develop a new set of competencies and foundation skills if they are to enjoy a productive, full and satisfying life. These are in addition to the Technical Workplace Competencies required by industry. SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid job performance.

The following activities will be performed by each student for successful completion of this course:

I. COMPETENCIES

A. Resources: Identifies, organizes, plans, and allocates resources
   1. follows a schedule to complete assigned tasks on time
   2. uses feedback to assess progress in course
   3. uses peer/instructor resources to reach identified goals
   4. assesses personal strength and areas of improvement and develops appropriate career goals

B. Interpersonal: Works with others
   1. works with peers in groups to accomplish instructional goals/objectives
   2. teaches instructional objectives assigned by instructor
   3. provides feedback to peers and instructor
   4. demonstrates good human relations skills in interpersonal interactions
5. communicates thoughts, feelings, and ideas and when appropriate, responsibly challenges existing procedures, policies, or authority
6. resolves conflict
7. works well with individuals from a variety of ethnic, social, and educational backgrounds in completing assigned tasks

C. Information: Acquires and uses information
1. engages in problem solving activities
2. uses critical thinking skills in evaluating issues related to psychology
3. selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multimedia methods
4. uses computers to complete lab assignments on assigned topics

D. Systems: Understands complex inter-relationships
1. demonstrates knowledge of organizational structure and uses the chain of command

II. FOUNDATION SKILLS
A. Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks.
1. Reading: Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
   a. reads and studies textbook
   b. completes reading assignments
   c. interprets reading assignments as demonstrated in classroom dialogue
   d. interprets/follows class schedule
2. Writing: Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
   a. completes written assignments and quizzes
   b. takes class notes
3. Listening: Receives, attends to, interprets, and responds to verbal messages and other cues
   a. receives/interprets verbal messages via didactic presentations
   b. responds to verbal messages
   c. confirms verbal message interpretations both in and out of class
   d. makes appropriate behavior response to verbal message
4. Speaking: Organizes ideas and communicates orally
   a. participates in classroom discussions
   b. organizes ideas and communicates specific questions to the instructor
   c. verbally affirms understanding of a concept, procedure, or required skill
   d. communicates effectively with peers

B. Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.
1. Creative Thinking: Generates new ideas
   a. develops new ideas for approaching problem solving
   b. participates in the brainstorming process
   c. participates in group problem solving
2. **Decision Making:** Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
   a. generates a personal and career development plan
   b. assess personal growth and development areas
   c. identifies actions required to accomplish personal goals
3. **Problem Solving:** Recognizes problems and devises and implements plan of action
   a. makes daily accommodations to stay on schedule
   b. seeks additional instruction/clarification for assignment completion
   c. balances social and academic life/responsibilities
   d. accepts responsibility
   e. demonstrates a creative solution to a problem in writing
   f. participates in group and individual problem solving process and learns the steps of problem solving
4. **Seeing Things In the Mind’s Eye:** Organizes, and processes symbols, pictures, graphs, objects, and other information
   a. participates in activities that encourage accepting responsibility for her/his career success
   b. participates in activities to strengthen belief in self-worth and encourage proactive/responsible choices
5. **Knowing How to Learn:** Use efficient learning techniques to acquire and apply new knowledge and skills
   a. develops techniques for adapting learning style for differences in teaching styles
   b. utilizes techniques for creative thinking
   c. develops strategies for problem solving
6. **Reasoning:** Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem
   a. performs self analysis of effective learning styles
   b. develops techniques for adapting learning style differences in teaching styles
   c. performs critical thinking

C. **Personal Qualities:** Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.
1. **Responsibility:** Exerts a high level of effort and perseveres towards goal attainment
   a. utilizes stress management techniques that facilitate and encourage goal attainment
   b. accepts responsibility for behavior and develops a proactive attitude
2. **Self-Esteem:** Believes in own self-worth and maintains a positive view of self
   a. provide positive feedback/encouragement
   b. provide individual mentoring/counseling to support the educational process
   c. encourage to develop interpersonal skills that will allow him/her to interact with confidence and project a positive self-image
d. encourage to practice positive peer feedback during daily exchange, in rotating diads; this activity is processed by the entire class and feelings are explored every class meeting

3. **Sociability:** Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
   a. participates in discussions of cultural diversity and its benefits
   b. discusses and demonstrates strategies for effective communication across cultures
   c. participates in discussions of gender diversity and sexism
   d. participates in discussions of different learning styles and disabilities
   e. encourage to adopt an attitude of tolerance

4. **Self-Management:** Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
   a. assesses self/personal goals and monitors individual progress
   b. performs goal setting activities
   c. conducts self assessment of performance on quizzes

5. **Integrity/Honesty:** Chooses ethical courses of action
   a. meets specific criteria standards to successfully complete the course
   b. demonstrates honesty and integrity while grading quizzes
   c. encourage to accept ethical and honest course action by example
   d. situations and group activities provide opportunities to explore and formulate professional and personal ethical standards
Machine Tool Advanced Skills Technology Program

MAST

REMOTE SITE/INDUSTRIAL TRAINING MODEL
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<td>Hotel Accommodations Information Brochure</td>
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<td>Facility Reservation Form</td>
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<td>Class Enrollment Form</td>
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<td>Class Roster Form</td>
<td>R-16</td>
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<tr>
<td>Class Attendance Record Form</td>
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<tr>
<td>Evaluation (Short) Form</td>
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<td>R-18b</td>
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<td>Evaluation (quotation)</td>
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<tr>
<td>Instructor’s Teaching Log Form</td>
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</tr>
<tr>
<td>Instructor’s Payment Time Sheet Form</td>
<td>R-22</td>
</tr>
</tbody>
</table>

**APPENDIX - C**

**MAST (Sample) REMOTE SITE TRAINING MODULES**

**MACHINIST SERIES** - Module MAC-E5

DUTY - PERFORM MEASUREMENT/INSPECTION

| TASK - Perform Measurement with Hand Held Instruments |

**INDUSTRIAL MAINTENANCE MECHANICS SERIES** - Module IMM-F5

DUTY - OPERATE MACHINE TOOLS

| TASK - Operate Lathe |

**TOOL AND DIE MAKER SERIES** - Module TLD-D3

DUTY - DEMONSTRATE KNOWLEDGE OF MANUFACTURING MATERIALS

| TASK - Discuss Classification System for Metals |
MAST REMOTE SITE/INDUSTRIAL TRAINING MODEL

INTRODUCTION

The key to training and educating a quality workforce is for colleges to partner with industry and provide training which is actually required for the workforce. Some colleges have been guilty of teaching only what the professor already knows rather than what industry says that it needs.

Colleges should use every opportunity and every tool at their disposal to cultivate partnerships with industry. Colleges should make every effort to provide training to industry in a form that industry can use.

The MAST project has developed a series of Technical Training Modules in fifteen metals-related occupations. The MAST Consortium spent many months interviewing “expert” workers and developing Competency Profiles which were based on the actual skills standards which were identified by industry. These duties and tasks have been validated through a Texas survey of over 300 companies and a National survey of over 3000 companies. These technical modules are available to be used by colleges to offer industrial or remote site training to companies. These modules are generic in nature and modular in format. This means that they can be easily “customized” by the trainer to fit many training situations. The modules can also be combined in many ways to provide industry with a catalog of training materials so that each company can select exactly the training modules which they need.

The Remote Site/Industrial Training Model offers guidelines for marketing and conducting remote site (industrial) training. The model contains documentation for all phases of industrial training from the original industry contact through completion of the course.

MAST hopes that the delivery of these materials in this volume will provide incentive for colleges and technical schools to begin knocking on the doors of industry and trying to create and foster the partnerships which are essential today. Only through these partnerships will America continue to have a qualified workforce.

This Remote Site/Industrial Training Model serves as a portion of the MAST deliverables and as a guide for marketing industrial training. This model was produced by MAST and any opinions, findings, and conclusions or recommendations expressed in this material are those of the MAST Consortium and do not necessarily reflect the views of the U. S. Department of Education. MAST has defined remote site training as being non-credit (for non-matriculating students) type courses that could be offered, either on-campus or off-campus for Continuing Education Units (CEUs). The following types of training would fall into this category: continuing education, industrial training, and adult learning.

MAST started with industry competency profiles based upon personal interviews with expert workers. These technical workplace competencies were validated by the faculty and then both state and national survey results were incorporated into courses and the curriculum. At the same
time the Secretary of Labor’s Commission on Achieving Necessary Skills (SCANS) was infused into the courses syllabi. The curriculum was pilot tested, syllabi were loaded onto the Internet and packaged for delivery.

**Part 1 - INDUSTRIAL TRAINING DEVELOPMENT PROCESS**

This Remote Site/Industrial Training Model includes an eleven-step Industrial Training Development Process. Some industries will have a complete training department with a cadre of instructors and support staffs. Others may have only one person assigned to a training department. College training development personnel must understand what takes place in the industrial setting when an industry is considering developing a training program. The following is a typical step-by-step process for developing training for industry.

**Eleven-Step Industrial Training Development Process**

1. Identify the training needs
2. Obtain management endorsement
3. Develop a training implementation plan
4. Develop training materials
5. Devise a training measurement follow-up plan
6. Select the best trainer for the course
7. Pilot test, evaluate and critique the course
8. Make modification and adjustments to the course
9. Approved training begins
10. Implement training measurement follow-up plan
11. Continue to monitor, evaluate and make adjustments to the training course as necessary

**Industrial Training Development Process Flowchart**

Constant communication with management is important. They must stay abreast of training development plans. Training may not be the problem. A lack of knowledge or skill requires training; other difficulties may require management action of another sort. The most critical phase of the whole process is in assessing needs and communicating them to management. This discussion often reveals a difference in how the needs are perceived.

The flowchart at Figure R-1 will serve as a guide for the college training developers to better understand how an industry would develop a training program.

**Part 2 - BENEFITS**

Technicians trained to standard is a common goal for technical colleges and industry. Training must be flexible and modular to keep up with changes in manufacturing technology. The nation’s manufacturers need to be assured of an available supply of trained, fundamentally sound technicians; access to cutting-edge applied research facilities, and the educational expertise
needed to retrain their workers. Colleges will continue to require funds, equipment, research ideas, jobs for their graduates, and the reputation of industry access required to attract both faculty and students. Benefits to both the college and industry are numerous. Below is a listing of some of those benefits.

Benefits to the College

- Recruitment of potential students
- Exposure to business and industry
- Increases credibility of the faculty and programs
- Confirms donations
- Provides potential advisory committee members
- Provides potential industry cooperative committee members
- Industrial support for state funding and legislation
- Contract hours
- Establishment of cooperative education programs for students
- Potential employment for graduates
- Faculty internships with industry
- Tours of industrial plants
- Speakers for classes
- Update faculty with changes in industry
- Purchase of equipment and supplies for the department

Benefits to Industry

- Improved employee morale
- The solution to immediate training problems and needs
- Increased growth potential in the marketplace
- Reduced employee turnover and cost
- Long-term stability of repeat business from satisfied customers
- Increased profits (return on training investment)
- Increased revenue from sales (short and long-term)
- Development of an updated training program
- Updated duties and tasks lists
- Competency Profiles Validated
- An inventory of current training materials, pilot tested, validated and proven to meet industry needs

Part 3 - MARKETING

Interested colleges will research the industrial market before developing an implementation plan. They must get answers to many questions, such as:

1. Are the program courses going to be offered for credit?
2. Are state support funds available?
3. Who is the competition?
4. Can the training be done on or off-campus?
5. What is going to be the cost for the program and the courses?
Once the college addresses these questions, then industry must determine its organizational strengths and weaknesses for doing this type of training, followed by a selection of the best possible training method for implementation, marketing, and training.

The marketing items presented below are to serve as tools to help the college promote their training program.

**Promotional Video and Brochure**
A program video and program brochure could be produced by the college to serve as a marketing tool for the college trainers. It is expected that this will expedite the marketing process for colleges offering training to industry. Both of these products could provide an overview of the training philosophy and course offerings. The video and brochure could prove to be very beneficial to industry personnel. These promotional items could be distributed to someone that expresses an interest in remote training and then a follow-up appointment should be made to further explain the training program.

**Promotional Catalog Offerings**
A six-month seminar catalog at Figure R-4 lists available courses. It should be used to provide details about the curriculum, individual courses, training dates and costs. This is a good way to get immediate response on the complete training program. It also has an example registration form.

**Promotional Course Brochure and Cover Letter**
A specific course brochure could also be produced which could be used to advertise a particular course offering. It would provide such information as time, location, prospective attendees, cost and major topics to be covered. It also includes a registration form with a method for payment.

It is recommended that this brochure be mailed in a printed college logo #10 envelope, with a cover letter and a #9 return postage paid envelope. The cover letter can be more personal and provide additional information about the details of the training program.

**News Release**
A News Release (example at Figure R-5) will serve as announcement to the media about the development and implementation of a new college training program. It should be released to local television, radio, and newspapers and follow-up contacts made for possible interviews and presentations. This publicity is usually free. Most colleges have some form of Marketing and Communications Office to provide assistance and guidance. News Releases can also be tailored for individual courses.

**Part 4 - TRAINING PROCESS AND SUPPORT DOCUMENTS**

Included in this Remote Site/Industrial Training Model are samples of a training process and support documents that can be developed for individual college remote site training programs. These training processes and documents serve as examples and can be modified to fit a unique
training program. The examples in Appendix B refer to classes being offered as seminars and workshops for non-credit, they could also be offered as credit classes.

Seminars/Workshops Process
The document at Figure R-6 is used to provide an overall operational process that moves from the planning stage, to conducting the class and the follow-up. It includes twenty different operations including: planning, public relations, facilities, schedules, refreshments and lunches, accommodations, registration, mailing lists, checklists, letters of agreement, time sheet and payroll, files, publications, visitor literature, invoicing, parking/security/telephone operator, certificates, evaluation, seminar schedule and follow-up.

Seminars/Workshops Personnel
The document at Figure R-7 should be used for planning personnel requirements needed to complete all of the operational processes. Depending upon the particular training plan, four personnel would be required to provide the support and coordination. A director who could perform the management functions, a program support person to take care of the registrations, scheduling, class participants, class activities and provide support to the instructor, a coordinator who would arrange for a classroom, refreshments/lunches, accommodations, parking/transportation and messages, and a clerical support person who would take care of the telephone registration, mail, fax, confirmations, files, invoicing, computer processes, and mailing lists.

Seminar Countdown Time Line
The form at Figure R-8 is used as a checklist to insure that all details have been covered prior to the start of the class. This time line is based upon an eight week schedule prior to a seminar and covers eighty-five checklist items.

Request from Business and Industry
The form at Figure R-9 is used by college personnel as the initial contact with industry. It should be kept in a log book with a recorded number and all the blanks completely filled out. This form can be used to establish a mailing list for future fliers and brochures. At the point of contact, an appointment time should be confirmed with the industry person to further discuss the company's training needs. An additional piece of paper can be attached to this request form that would serve as an activities log for recording additional meeting dates and those results.

Seminar Registration Form
The form at Figure R-10 is used to register all participants for a particular seminar class. It includes spaces for names, company, address, telephone/fax numbers, housing information, and method of payment.

Seminars & Workshops Enrollment Confirmation
The form at Figure R-11 is used to confirm by mail or fax the participant enrollment in the seminar. It provides information such as the name of the enrolled trainee, name of seminar, training dates and times, seminar location and the confirmation number. It provides other information to the trainee such as substitutions, cancellations, Continuing Educations Units (CEUs) and describes expenses that are tax deductible.
Campus Map
A map of your college campus should be used to provide the location where the training is going to be conducted. It is usually mailed or faxed with the enrollment confirmation form.

Hotel Accommodations
The information brochures at Figure R-12 should be mailed or faxed with the enrollment confirmation to provide a list of amenities offered, location and a toll free registration process. Special arrangements can be made with one hotel to become the host for these seminars.

Facility Reservation
The form at Figure R-13 is used for reserving classroom space, providing a description of the room configuration, audiovisual materials and any other special requests.

Refreshment/Lunch Arrangements
The form at Figure R-14 is used for requesting refreshments, lunch or other graduation activities for the seminar participants.

Class Enrollment
The form at Figure R-15 is used as the official enrollment document for the class participant. It provides all of the vital information needed for communication purposes. It collects important participant data that may be required by the college's administration and can also serve as a record of payment for the college's business office.

Parking Permit and Rules
A parking permit is usually issued by the college to the class participant for short term parking on campus. Any parking information and rules should also be provided. Needless to say, it is embarrassing to have your invited guests receive a parking ticket or worse, have their vehicle towed. Work with your college's public safety and parking department to make sure all parking arrangements are complete.

Class Roster
The form at Figure R-16 is used primarily by the instructional personnel as an attachment to a class record folder. It provides most of the important information about the class and serves as a one page class fact sheet. Such things as the class name, number, training dates and times, instructor, hours, building and room location, cost and minimum and maximum class size are furnished. It also provides a list of class participants, their telephone numbers, notes and receipt information.

Class Attendance Record
The form at Figure R-17 is to be used by the instructional personnel to keep attendance records on class participants. The sample attached is a Weekly Attendance Record form. This form could be modified to include several weeks or months, or modified for any class length.

Evaluation
The form will be completed by the class participant and is designed to provide feedback to the instructor. It will include such things as the class name, instructor name and date as well as
several major points that will help the instructor improve the class or make necessary modifications. All evaluation forms should have a space for additional comments by the class participant. Attached to this Remote Site Training Model are three types of evaluation forms: 1) Evaluation (short) - has only ten items to be evaluated; 2) Course (long & detailed) - has twenty-seven items to be evaluated; and 3) Program Evaluation (quotation) - provides a place for comments that can be used in future marketing literature.

1. Evaluation (short) - The form at Figure R-18a is used when a class has been running successfully for more than three times. It has only ten major items that are evaluated on a scale of one to five (five being the highest). It has a few lines for additional comments.

2. Course Evaluation (long & detailed) - The form at Figure R-18b is used primarily for pilot classes. It is a two page document with four major topics and twenty-seven individual items to be evaluated on a scale of one to four (four being the highest). Each of the four major topics has a few lines for additional comments. It concludes with lines for any changes or recommendations for improvement and additional lines for other comments. It could be used for the first three classes.

3. Program Evaluation (quotation) - The form at Figure R-18c is used when you are looking for quotable comments that can be used for future publication literature. It contains the class participant's name and address. It also has more fill-in-the-blank spaces and asks for a contact person for a possible on-site presentation. An additional sheet can be attached that asks questions about the hotel, airport services, transportation, museums and restaurants.

Certificate of Completion
A Certificate of Completion from the college is used for awarding the Continuing Education Units (CEUs) from the college. This document is printed on good quality certificate type paper and usually includes two colors in the printing ink. It provides the name of the seminar participant, the date of completion, the number of CEUs earned, number of hours of training, title of course and the course objective.

Certificate of Competency
The document at Figure R-19 states that the participant has satisfactorily completed the required competencies acknowledged on the reverse side for the program in which they are enrolled. The backside of this certificate will contain the Competency Profile of the “Duties” and “Tasks” which were performed by the class participant. The instructors are requested to authenticate the degree of mastery achieved by the participant by checking the appropriate box each time the participant masters a competency.

Class Report
The form at Figure R-20 is used by the college when a class is completed. It contains some of the same information as the Class Roster, but also includes any grade records. It is usually filed with a state educational agency office and may be used for obtaining state funds for training with industry.
Instructor's Teaching Log
The form at Figure R-21 is used by the instructor for recording the teaching hours for one month. It includes instructor's name, month, year, seminar name and number, and the number of days in a month. It also includes a place for the instructor to record the actual teaching hours, comments, total hours and the instructor's signature.

Instructor's Payment Time Sheet
The form at Figure R-22 is used by the program director for paying the instructor. It is set up for a weekly pay activity; the amount of money to be paid, expected payment date and the director's signature.

Thank You
A “Thank You” note or card could be used by the program director as a follow-up to the completion of the class; to be used as a personal note to the instructor, class participants, or the company.
Appendix A.....of the MAST Remote Site/Industrial Training Model contains the documentation which is recommended to aid in the marketing of the seminar/workshop or training program.
ELEVEN-STEP INDUSTRIAL TRAINING DEVELOPMENT PROCESS

1. IDENTIFY TRAINING NEEDS

2. OBTAIN MANAGEMENT ENDORSEMENT
   - NO → NO TRAINING
   - YES →

3. DEVELOP TRAINING & IMPLEMENTATION PLAN
   - NOT APPROVED → REVISE

4. PURCHASE/DEVELOP TRAINING MATERIALS

5. DEVISE TRAINING MEASUREMENT/FOLLOW-UP PLAN
   - NOT APPROVED → REVISE

6. SELECT A TRAINER

7. PILOT TEST, EVALUATE & CRITIQUE

8. MAKE MODIFICATIONS & ADJUSTMENTS

9. APPROVED TRAINING BEGINS

10. IMPLEMENT TRAINING MEASUREMENT/FOLLOW-UP PLAN

11. MONITOR, EVALUATE & ADJUST TRAINING

ON-GOING

MANAGEMENT REVIEW

Figure R-1
INDUSTRIAL (REMOTE SITE) TRAINING

BENEFITS TO COLLEGES

WHAT'S IN IT FOR ME?

USING WITH THE REMOTE SITE TRAINING MODULES (DEVELOPED BY THE MAST PROGRAM), AND WORKING WITH YOUR LOCAL INDUSTRIES, YOUR LOCAL COLLEGE ECONOMIC DEVELOPMENT AND INDUSTRIAL TRAINING DIVISION CAN BE A PART OF IMPROVING THE CURRENT WORKFORCE THROUGH INDUSTRIAL (REMOTE SITE) TRAINING. BUT THE NUMBER ONE QUESTION, "WHAT IS IN IT FOR ME?" CAN BE ANSWERED BY THE FOLLOWING:

- Recruitment of potential students
- Exposure to Business and Industry
- Increases Credibility of the Faculty and Programs
- Confirms Donations
- Provides Potential Advisory Committee Members
- Provides Potential School-industry Cooperative Committee Members
- Industrial Support for State Funding and Legislation
- Contract Hours
- Establishment of Cooperative Education Programs for Students
- Potential Employment for Graduates
- Faculty Internships with Industry
- Tours of Industrial Plants
- Speakers for Classes
- Update Faculty with Changes in Industry
- Purchase of Equipment and Supplies for the Department

If you are interested in Industrial (Remote Site) Training, contact the MAST Program at (817) 867-4849 for more information about the Remote Site Training Modules...and then you can experience what is in it for you!

Figure R-2
INDUSTRIAL (REMOTE SITE) TRAINING

BENEFITS TO INDUSTRY

WHAT'S IN IT FOR ME?

WORKING WITH THE REMOTE SITE TRAINING MODULES (DEVELOPED BY THE MAST PROGRAM), AND WORKING THROUGH YOUR LOCAL COLLEGE ECONOMIC DEVELOPMENT AND INDUSTRIAL TRAINING DIVISION, YOUR COMPANY CAN BE A PART OF IMPROVING THE CURRENT WORKFORCE THROUGH INDUSTRIAL (REMOTE SITE) TRAINING. BUT THE NUMBER ONE QUESTION, "WHAT IS IN IT FOR ME?" CAN BE ANSWERED BY THE FOLLOWING:

- Improved Employee Morale
- The Solution to Immediate Training Problems and Needs
- Increased Growth Potential in the Marketplace
- Reduced Employee Turnover and Cost
- Long-term Stability of Repeat Business from Satisfied Customers
- Increased Profits (Return on Training Investment)
- Increased Revenue from Sales (Short and Long-term)
- Development of an Updated Training Program
- Updated Duties and Tasks Lists (Job Descriptions)
- Competency Profiles Validated
- An Inventory of Current Training Materials, Pilot Tested, Validated and Proven to meet Industry Needs

If you are interested in Industrial (Remote Site) Training, contact your local technical or community college Industrial Training office...and then you can experience what is in it for you!
The Center for Professional Development

Presents

Conferences, Seminars & Workshops

January - June 1996

Programs offered in the following areas:

- Air Conditioning
- Drafting & Design
- Electronics
- Health & Safety
- MSHA & OSHA
- First Aid & CPR
- Vacuum
- Diesel Mechanics
- Electrical
- Hazardous Materials
- ISO 9000
- Nondestructive Testing
- Optics
- Welding

To Enroll Call

or fax: ____________________

Purchase Orders, Personal Checks, MasterCard, Visa or Discover accepted

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**ASBESTOS ABATEMENT**

Asbestos Abatement for Contractors/Supervisors
- Hours: 40
- Course Fee: $595
- March 18-22
- May 13-17

Asbestos Abatement for Contractors/Supervisors Refresher
- Hours: 8
- Course Fee: $185
- March 29
- May 24

Asbestos Abatement Workers
- Hours: 32
- Course Fee: $395
- February 20-23
- April 30-May 3

Workers Refresher
- Hours: 8
- Course Fee: $185
- February 19
- April 29

**AIR CONDITIONING & REFRIGERATION PRINCIPLES**

Basic Principles
- Hours: 32
- Course Fee: $395
- Feb. 27-March 1
- April 23-26
- June 25-28

Advanced Principles
- Hours: 32
- Course Fee: $395
- March 26-29
- May 28-31
- July 23-26

**NEW! BASIC RADIATION PROTECTION**

- Hours: 32
- Course Fee: $495
- March 4-8
- June 3-7

**BASIC VACUUM TECHNIQUES**

- Hours: 24
- Course Fee: $345
- March 6-8
- June 5-7

**CONSTRUCTION SAFETY & HEALTH**

- Hours: 10
- Course Fee: $145
- March 21-22
- May 23-24

**NEW! DIESEL MECHANICS**

Basic Heavy Equipment Hydraulics
- Hours: 16
- Course Fee: $195
- May 28-29

Diesel Engine Electronics Controls
- Hours: 16
- Course Fee: $245
- May 30-31

Diesel Engine Tune up
- Hours: 16
- Course Fee: $245
- May 23-24

Final Drive and Undercarriage
- Hours: 16
- Course Fee: $225
- May 28-29

Heavy Equipment Air Conditioning
- Hours: 16
- Course Fee: $245
- February 29 & March 1

Heavy Equipment Electrical Systems
- Hours: 16
- Course Fee: $245
- February 19-22 (Evenings)

Heavy Equipment Failure Analysis
- Hours: 16
- Course Fee: $195
- May 30-31

Small Air Cooled Engine Repair
- Hours: 16
- Course Fee: $145
- February 29 & March 1

Truck Brake Systems
- Hours: 16
- Course Fee: $195
- March 4-5

Truck Power Trains
- Hours: 16
- Course Fee: $195
- March 4-5

**EFFECTIVE PERSONAL MANAGEMENT**

- Hours: 4.5
- Course Fee: $179
- February 15
- March 19

**ELECTRICAL**

Electrical Safety-Related Work Practices
- Hours: 7
- Course Fee: $139
- February 23
- April 19
- June 21

Eddy Current Evaluation
- Hours: 40
- Course Fee: $495
- March 4-8
- May 20-24

Electromagnetic Interference/Electromagnetic Compatibility/Electromagnetic Pulse Testing (EMI/EMC/EMP)
- Hours: 40
- Course Fee: $495
- March 4-8
- June 3-7

**ELECTRONICS**

Electronics Part I
- Hours: 80
- Course Fee: $695
- April 8-19
- July 15-26

Electronics Part II
- Hours: 80
- Course Fee: $695
- April 29-May 10
- August 19-30

**NEW! FIRST AID & CPR CERTIFICATION**

- Hours: 6
- Course Fee: $30
- February 29
- May 12

**HAZARDOUS MATERIALS**

First Responder Awareness Level
- Hours: 8
- Course Fee: $185
- February 16
- April 19

Hazardous Material Technician
- Hours: 24
- Course Fee: $210
- Feb. 28-Mar. 1
- May 29-31

Hazardous Material Technician Refresher
- Hours: 8
- Course Fee: $495
- February 27
- May 28

Hazardous Wastesite Workers (HAZWOPER)
- Hours: 40
- Course Fee: $495
- March 4-8
- June 3-7

Hazardous Wastesite Workers (HAZWOPER) Refresher
- Hours: 8
- Course Fee: $185
- February 26
- June 10

**NEW! HM-126F TRANSPORTATION SAFETY**

- Hours: 8
- Course Fee: $185
- April 17
- June 26
ISO 9000
Understanding ISO 9000
Hours: 8
* March 14
* May 9
* July 11

Internal Auditing Process for ISO 9000
Hours: 8
* March 28
* May 23
* July 25

LEAD ABATEMENT
Lead Abatement for Contractors/Supervisors
Hours: 40
* March 11-15
* June 17-21

Lead Abatement for Contractors/Supervisors Refresher
Hours: 8
* February 15
* April 18

Lead Abatement Worker
Hours: 32
* March 25-28
* June 11-14

Lead Inspection Training
Hours: 24
* February 12-14
* May 20-22

NEW! LENDERS WORKSHOP FOR RURAL GUARANTY LOANS
Hours: 7
* February 23

MINE SAFETY & HEALTH ADMINISTRATION
90-Hour Electrical Certification
Hours: 90
* January 15-19, 22-26 & 29
* May 6-10, 13-17 & 20

SHA Annual Refresher
Hours: 8
* February 14
* April 17
* June 12
* March 20
* May 15

Electrical Refresher
Hours: 8
* September 11
* November 13
* October 2
* December 11

Newly Employed Miner - Experienced
Hours: 6
* February 14
* April 17
* June 12
* March 20
* May 15

Newly Employed Miner - Inexperienced
Hours: 24
* March 26-28
* June 25-27

Train-The-Trainer
Hours: 24
* August 6-8

OPTICS
Fundamental Principles Optics
Hours: 40
* Feb. 26-Mar. 1
* May 20-24

Optical Tooling
Hours: 80
* March 18-29
* June 10-21

Laser Optics
Hours: 40
* March 4-8
* June 3-7

WELDING
Certified Welding Inspector (CWI) Test Preparation
Hours: 36
* January 15-19
* March 11-15
* May 13-17

Introduction to Welding Equipment Troubleshooting & Repair
Hours: 32
* February 26-29
* May 28-31

Flux Core Arc Welding
Hours: 8
* February 7
* April 3
* June 5

Gas Metal Arc Welding
Hours: 8
* February 14
* April 10
* June 12

Gas Tungsten Arc Welding
Hours: 8
* March 6
* May 1
* July 10

Welding Safety
Hours: 8
* March 20
* May 8
* July 17

NEW! ENVIRON-SAFE CONFERENCE & EXPO
* September 17-19

ATTENTION ATTENDEES & EXHIBITORS
Early registration ends April 1
* Fee includes all presentations, lunches, breaks, seminars and materials
* Cancellation & refund no later than August 1

For more information call

Pre-registration is required one week in advance for most seminars.
Seminars requiring more advanced notice are noted.

All fees include instructional material, handouts, refreshments and coffee breaks.

All participants will receive Continuing Education Units (CEUs) and certificates upon successfully completing each seminar.

To schedule a seminar in your city, please call

for more information.
AIR CONDITIONING & REFRIGERATION PRINCIPLES SEMINARS

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 32-hour seminar on Basic Air Conditioning & Refrigeration Principles, or Advanced Air Conditioning & Refrigeration Principles. These intense seminars will include theory and hands-on lab troubleshooting exercises. The seminar does include 50 percent hands-on exercises in the labs of the Air Conditioning & Refrigeration Technology. A textbook will be provided to all seminar participants. Participants will be required to bring their own basic hand tools for opening up a unit and a volt meter. Prerequisite required for Advanced seminar: Participants need to have successfully completed Basic Air Conditioning & Refrigeration Principles seminar or equivalent training.

WHO SHOULD ATTEND?
Air Conditioning & Refrigeration Technicians

SEMINAR TOPICS
- Elements of the refrigeration cycle
- Shop safety practices & tools
- Basic automatic controls
- Heating & cooling
- Electrical controls
- Mechanical controls
- Troubleshooting

WHEN
Basic Principles, 32-hour seminar, 3.2 CEUs 8 a.m.-5 p.m.
- Seminar #96-9204 Tue.-Fri., February 27-March 1
- Seminar #96-9205 Tue.-Fri., April 23-26
- Seminar #96-9206 Tue.-Fri., June 25-28
COST: $395 per participant

Advanced Principles, 32-hour seminar, 3.2 CEUs 8 a.m.-5 p.m.
- Seminar #96-9207 Tue.-Fri., March 26-29
- Seminar #96-9208 Tue.-Fri., May 28-31
- Seminar #96-9209 Tue.-Fri., July 23-26
COST: $395 per participant

ASBESTOS ABATEMENT CERTIFICATION SEMINARS

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a five-day seminar on Asbestos Abatement for Contractors/Supervisors or a one-day refresher. The four-day seminar for the Asbestos Abatement Worker or a one-day refresher. These seminars meet all Environmental Protection Agency (EPA) requirements with a registered certificate number and an identification card issued to participants upon completion.

WHO SHOULD ATTEND?
Contractors, consultants, supervisors, managers, pre-supervisors, foremen, safety officers, safety coordinators, or other professionals involved in the planning of asbestos abatement activities, or any worker who may encounter asbestos containing material (ACM) exposure during the course of their work activities.

CONTRACTORS/SUPERVISORS & REFRESHER

SEMINAR TOPICS
- Asbestos abatement laws for licensed or registered personnel who received training in other states
- Federal, state & local regulations
- Respiratory protection program
- Health effects
- Insurance & liability issues
- Glove-bag removal procedures
- Air monitoring
- Physical characteristics of asbestos & asbestos containing material (ACM)
- Decontamination units
- Contract specifications
- Medical surveillance programs
- Personal protective equipment
- State-of-the-art work practices/abatement activities

WHEN
Contractors/Supervisors, 40-hour seminar, 4.0 CEUs, 8 a.m.-5 p.m.
- Seminar #96-9134 Mon.-Fri., March 18-22
- Seminar #96-9135 Mon.-Fri., May 13-17
COST: $595 per participant

Refresher, 8-hour seminar, 0.8 CEUs, 8 a.m.-5 p.m.
- Seminar #96-9136 Friday, March 29
- Seminar #96-9137 Friday, May 24
COST: $185 per participant

WORKERS & REFRESHER

SEMINAR TOPICS
- Background information on asbestos
- Health effects & medical monitoring
- Federal, state & local regulations
- State-of-the-art work practices
- Air monitoring
- Respiratory protection
- Personal protective clothing
- Glove-bag removal procedures
- Decontamination units
- Negative air machines & HEPA filters
- Asbestos removal techniques

Asbestos Abatement Worker, 32-hour seminar, 3.2 CEUs, 8 a.m.-5 p.m.
- Seminar #96-9138 Mon.-Thurs., February 20-23
- Seminar #96-9139 Mon.-Thurs., April 30-May 3
COST: $395 per participant

Refresher, 8-hour seminar, 0.8 CEUs, 8 a.m.-5 p.m.
- Seminar #96-9210 Friday, February 19
- Seminar #96-9211 Monday, April 29
COST: $185 per participant
**BASIC RADIATION PROTECTION**

**INTRODUCTION**

New Campus USA's Seminars & Workshops invites you to participate in a 32-hour seminar on Basic Radiation Protection. This seminar is designed to train participants with a minimal scientific background in the fundamentals of radiation protection. Radiation safety criteria as applied to the disposal of low-level radioactive waste. Technical classroom sessions are supplemented with practical hands-on laboratory exercises. These training hours can be applied toward the regulated mandate training requirements required by the any state. ANY CAMPUS USA Radiation Protection Technology is licensed by the state's Bureau of Radiation Protection Control to provide training.

**WHO SHOULD ATTEND?**

Radiation safety professionals, safety officers, industrial hygienists, technicians, environmental personnel, supervisors, and anyone else involved in activities that may require training in radiation protection.

**SEMINAR TOPICS**

- Introduction to radiation protection & pre-test
- Radiation & matter
- Instrumentation
- Personnel monitoring
- Biological effects of radiation
- Radiation dose limits
- Applied health physics procedures
- Environmental radioactivity sampling & analysis
- Radioactive waste
- Review & post-test

**WHEN**

New! Basic Radiation Protection, 32-hour seminar, 3.2 CEUs
Seminar #96-9214 Mon. - Friday, March 4-8
Seminar #96-9215 Mon. - Friday, June 3-7
COST: $495 per participant. Will need a scientific pocket calculator.
Training Times: Monday 1-5 p.m.
Tuesday - Thursday 8 a.m. - 5 p.m.
Friday 8 a.m. - noon

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**BASIC VACUUM TECHNIQUES WORKSHOP**

**INTRODUCTION**

Any Campus USAs Seminars & Workshops invites you to participate in a 24-hour workshop on Basic Vacuum Techniques. This workshop is designed to give the participant a working knowledge and a basic understanding of vacuum technology with attention to fundamental theory, pumping principles, vacuum pumps, measurements, gauges auxiliary equipment, and basic vacuum systems. The systems covered will include mechanical systems, oil diffusion systems, turbo molecular systems, and cryogenic systems. The workshop will also include troubleshooting techniques, demonstrations and hands-on exercises to reinforce the materials covered in the classroom sessions.

**WHO SHOULD ATTEND?**

Technicians who work with vacuum systems or those who want a working knowledge of vacuum techniques.

**WORKSHOP TOPICS**

- Vacuum fundamentals
- Roughing pumps
- High vacuum pumps
- Ultrahigh vacuum pumps

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**CONSTRUCTION SAFETY AND HEALTH**

**INTRODUCTION**

Any Campus USA's Seminars & Workshops invites you to participate in a 10-hour seminar on Construction Safety & Health. This seminar will be conducted on two days to allow for theory sessions and practical exercises in the review and interpretation of the standards published in the 29 CFR 1926. Participants will receive US Department of Labor certification for the seminar.

**WHO SHOULD ATTEND?**

Safety & health personnel, managers, and other persons who may be responsible for safety & health duties while working in the Construction Industry. Prerequisite: Some knowledge of the standards and 29 CFR 1926 would be helpful, but not necessary.

**WHEN**

Construction Safety and Health
10 hour seminar, 1.0 CEUs, 9 a.m. - 3 p.m.
Seminar #96-9229 Thur. - Fri., March 21-22
Seminar #96-9230 Thur. - Fri., May 23-24
Cost: $145 per participant

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**DIESEL MECHANICS SEMINARS**

**BASIC HEAVY EQUIPMENT HYDRAULICS**

**INTRODUCTION**

Any Campus USA's Seminars & Workshops invites you to participate in a 16-hour seminar on Basic Heavy Equipment Hydraulics. This seminar addresses component identification, system types and their component locations, as well as the use of graphic symbols. Hydraulic principles such as the basic characteristics of liquids, definitions of horse power and work, relationships of pressure and flow to power as well as calculations of hydraulic efficiency are introduced so that the participant may compare "ideal values" to "actual situations". A systematic approach to troubleshooting addressing the use of hydraulic analyzers and pressure gauges caps off the latter part of the seminar.

**WHO SHOULD ATTEND?**

Diesel engine technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained hydraulic technicians.

**SEMINAR TOPICS**

- Hydraulic principles
- Component functions & symbols
- Types of circuits
- Troubleshooting
WHEN  
New! Basic Heavy Equipment Hydraulics  
16-hour seminar, 1.6 CEUs, 8 a.m. - 5 p.m.  
Seminar #(96-9225)  Tue. - Wed., May 28-29  
COST: $195 per participant.  
Please call ____________ for additional training schedules.

DIESEL ENGINE ELECTRONICS CONTROLS

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 16-hour seminar on Diesel Engine Electronics Controls. This seminar is designed as a basic electrical review for the diesel engine technician. This seminar will include how the basic computer system works on the diesel engine, the basic components used to make up the computer system, the standard programming used by most manufacturers that produce electronic unit injection engines, and the diagnostic principles used to find problems in the diesel computerized engines. The electronic diesel engines referenced will be Caterpillar (EUI), Detroit Diesel (DDEC), Cummins (CELECT), and Mack (V-MAC). Prerequisite: Heavy equipment electrical systems seminar.

WHO SHOULD ATTEND?
Diesel engine technicians, maintenance personnel, dealership personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained diesel engine technicians.

SEMINAR TOPICS
• Review of electricity & testing  
• Computer operations  
• Common computer components  
• Common diesel engine computer programming  
• Diagnostics

WHEN  
New! Diesel Engine Electronics Control  
16-hour seminar, 1.6 CEUs, 8 a.m. - 5 p.m.  
Seminar #(96-9226)  Thur. - Fri., May 30-31  
COST: $245 per participant.  
Please call ____________ for additional training schedules.

DIESEL ENGINE TUNE UP

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 16-hour seminar on Diesel Engine Tune up. This seminar will present to the diesel engine technician the use of basic diesel engine principles to tune up a diesel engine, the procedures most commonly used by diesel engine manufacturers and common tune up practices used on Detroit, Cummins, and Caterpillar engines. This seminar is structured to provide approximately 50 percent hands-on laboratory exercises.

WHO SHOULD ATTEND?
Diesel engine technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained diesel engine technicians.

SEMINAR TOPICS
• Engine operations  
• Air induction service  
• Basic engine  
• Oil, cooling, & fuel systems

WHEN  
New! Diesel Engine Tune up, 16-hour seminar, 1.6 CEUs, 8 a.m. - 5 p.m.  
Seminar #(96-9222)  Thurs. - Fri., May 23-24  
COST: $245 per participant.  
Please call ____________ for additional training schedules.

FINAL DRIVE AND UNDERCARRIAGE

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 16-hour seminar on Final Drive and Undercarriage. This seminar will include operation theory, evaluation of component wear, and repair methods for various designs of steering systems, final drives and undercarriage systems. This seminar is structured to provide approximately 60 percent hands-on exercises.

WHO SHOULD ATTEND?
Diesel engine technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained final drive and undercarriage technicians.

SEMINAR TOPICS
• Crawler steering systems  
• Final drive types  
• Undercarriage components

WHEN  
New! Final Drive and Undercarriage  
16-hour seminar, 1.6 CEUs, 8 a.m. - 5 p.m.  
Seminar #(96-9223)  Tues. - Wed., May 28-29  
COST: $225 per participant.  
Please call ____________ for additional training schedules.

HEAVY EQUIPMENT AIR CONDITIONING

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 16-hour seminar on Heavy Equipment Air Conditioning. This seminar covers the theory of refrigerant, system components, system controls, testing, repairing and servicing. The use of refrigerant recovery methods will also be discussed. Refrigerant Certification registration is also included in this seminar. This seminar is structured to provide approximately 60 percent hands-on exercises.

WHO SHOULD ATTEND?
Diesel engine technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained heavy equipment air conditioning technicians.

SEMINAR TOPICS
• Theory of operations  
• System components  
• Test equipment & tools required  
• System test procedures  
• System troubleshooting  
• System servicing & repair

WHEN  
New! Heavy Equipment Air Conditioning  
16-hour seminar, 1.6 CEUs, 8 a.m. - 5 p.m.  
Seminar #(96-9219)  Thurs.- Fri., February 29-March 1  
COST: $245 per participant.  
Please call ____________ for additional training schedules.
HEAVY EQUIPMENT ELECTRICAL SYSTEMS

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a 16-hour seminar on Heavy Equipment Electrical Systems. This seminar will provide the basic theory of electricity and how to use a digital Volt Ohms Meter (DVOM) to work with voltage, amperage, and resistance. The application of Ohm’s law to series circuits, parallel circuits, and series/parallel circuits will be connected with electric current. The participant will use wiring schematics to trace circuit problems dealing with lighting, instrumentation, charging, and starting. The participant will learn how to use a hydrometer, refractometer, load tester, and charger to diagnose battery problems. This seminar is structured to provide approximately 60 percent hands-on exercises.

WHO SHOULD ATTEND?
Diesel engine technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained electrical technicians.

SEMINAR TOPICS
• Basic electricity
• Battery
• Wiring, lighting/instrumentation
• Charging system
• Starting system

WHEN
New! Heavy Equipment Electrical Systems
16-hour seminar, 1.6 CEUs, 6-10 p.m. (Evenings)
Seminar #96-9217 Mon.-Thurs., February 19-22
COST: $245 per participant.
Please call for additional training schedules.

SMALL AIR COOLED ENGINE REPAIR

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a 16-hour seminar on Small Air Cooled Engine Repair. This seminar is designed to introduce the participant to the basic fundamentals of small air cooled engines to include design, tuneup, overhaul, and basic troubleshooting. This seminar is structured to provide approximately 90% hands-on exercises.

WHO SHOULD ATTEND?
Engine technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained small air cooled engine technicians.

SEMINAR TOPICS
• Operating principles of four-cycle engines
• Differentiate four-cycle small engines from two-cycle small engines
• Identify small engine components
• Function of small engine components
• Tune up a small engine
• Disassemble & assemble a small engine
• Troubleshoot a small engine

WHEN
New! Small Air Cooled Engines
16-hour seminar 1.6 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9218 Thurs.-Fri., February 29-March 1
COST: $145 per participant.
Please call for additional training schedules.

TRUCK BRAKE SYSTEMS

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a 16-hour seminar on Truck Brake Systems. This seminar will cover the fundamentals of air brake systems and troubleshooting. It will also cover the foundation brakes. This seminar is structured to provide approximately 60 percent hands-on exercises.

WHO SHOULD ATTEND?
Diesel engine technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained truck brake technicians.

SEMINAR TOPICS
• Fundamentals of braking
• Dual air brake system principles
• Foundation brakes

WHEN
New! Truck Brake Systems, 16-hour seminar, 1.6 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9221 Mon.-Tues., March 4-5
COST: $195 per participant.
Please call for additional training schedules.

TRUCK POWER TRAINS

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a 16-hour seminar on Truck Power Trains. This seminar includes the disassembly, inspection and reassembly of the 9-speed and 13-speed transmissions.
WHO SHOULD ATTEND?
Diesel engine technicians, transmission technicians, maintenance personnel, dealership personnel, equipment personnel, consultants, supervisors, managers, foremen, or anyone else involved in activities that may require trained truck power trains technicians.

ELECTRICAL SEMINARS

EDDY CURRENT EVALUATION

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 40-hour workshop on Eddy Current Evaluation. This workshop provides the participant with knowledge of the principles, procedures, applications, and capabilities of eddy current inspection methods. This workshop is intended to enable the participant to determine that proper inspection techniques and procedures. This workshop also includes numerous hands-on laboratory exercises to reinforce the learning process. Prerequisite: Participants should possess a knowledge of basic electricity.

WORKSHOP TOPICS
- Review of basic electrical & magnetic theory and terms
- Eddy Current Theory
- Types of sensing elements
- Factors which affect coil impedance
- Signal/noise ratio
- Selection of test frequency
- Coupling
- Field strength & its selection
- Instrument design considerations
- Read-out mechanism
- Applications
- Standards & operating procedures
- Overview & discussion of American Society For Testing Material standards
- Review of available equipment
- Review of codes, specifications and standards
- Quizzes & discussions
- Tests: open book
- Basic theory
- Specific applications
- Practical applications

EFFECTIVE PERSONAL MANAGEMENT WORKSHOP

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a 4 1/2 hour workshop on Effective Personal Management. This workshop is for professionals who have a need to become more active and improve productivity. Imagine having time to do the things that are really important to you. The Effective Personal Management Workshop provides you with the tools and the training to help you live a less stressful, more balanced life. Also, included in this workshop fee is a $75 value My-Tyme Success Planner organizer and a two hour follow-up workshop in 30 days.

OVERVIEW
In this Effective Personal Management Workshop participants will learn how to:
1. Find an additional 2-3 hours per day to work on important goals and high pay activities that you don’t have time for now.
2. Increase your productivity by a minimum of 15-20%.
3. Gain control of your personal and professional time by scheduling your priorities.
4. Become more proactive and reduce stress levels by practicing the four steps of proactive self-management.
5. Manage all the commitments and promises made and accepted so that nothing slips through the cracks.

WHO SHOULD ATTEND?
Executives, managers, supervisors, contractors, pre-supervisors, foremen, project leaders, consultants, professionals, and anyone else interested in finding more time in their work schedule for doing High Pay Activities (HPA).

WHEN
4 1/2-hour workshop, 0.4 CEUs, 8 a.m. - 12:30 p.m.
Workshop #96-9114) Tuesday, January 23
Workshop #96-9115) Thursday, February 15
Workshop #96-9116) Tuesday, March 19
JST: $179 per participant
As an added bonus, your tuition for this seminar also includes a two hour follow-up workshop.

ELECTRICAL SAFETY-RELATED WORK PRACTICES

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a one-day seminar on Electrical Safety-Related Work Practices. This seminar is based upon current Occupational Safety and Health Administration Electrical Safety Work Rules and is designed to satisfy the training requirement of these rules.

WHO SHOULD ATTEND?
Maintenance personnel, electricians, mechanics, repairers, engineers, technicians, safety coordinators, loss control specialists, supervisors, pre-supervisors, administrators and management personnel. Management and administrative personnel may also wish to attend so that they may evaluate their company’s safety program, establish lockout/tagout procedures, and identify the training needs of their employees.
SEMINAR TOPICS
• OSHA 29 CFR Subpart S—Electrical
• Safety-related work practices
  • 1910.331 Scope
  • 1910.332 Training
  • 1910.333 Selection and use of work practices
  • 1910.334 Use of equipment
  • 1910.335 Safeguards for personal protection
  • Lockout/Tagout procedures
  • 1910.147 Control of hazardous energy
• Employee protection
• Energy control procedures and applications
• Communications
• Equipment grounding procedures
• Most often cited examples
• Electrical safety

WHEN
Electrical Safety-Related Work Practices
7-hour seminar, 0.7 CEUs, 8:30 a.m. - 4:30 p.m.
  Seminar #96-9191) Friday, February 23
  Seminar #96-9192) Friday, April 19
  Seminar #96-9193) Friday, June 21
COST: $139 per participant.
Enroll three from the same company and the fourth attends free.

ELECTROMAGNETIC INTERFERENCE/ELECTROMAGNETIC COMPATIBILITY/ ELECTROMAGNETIC PULSE TESTING (EMI/EMC/EMP)

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 40-hour workshop on Electromagnetic Interference/Electromagnetic Compatibility/Electromagnetic Pulse Testing (EMI/EMC/EMP). This workshop will focus on the format, application and implementation of the military standards. Mathematical considerations, including power ratios (decibels), will be reviewed. The definitions and terms related to EMI/EMC/EMP will be studied and discussed. Prerequisite: Participants should have a good background in quality aspects of electrical and electronic commodities and have completed Electronics Part I and Electronics Part II, or equivalent experience. A solid knowledge of basic algebra and trigonometry is required.

WORKSHOP TOPICS
• The Decibel
  Antilog who numbers and fractions for the common logs with a logarithm chart
  Calculate path loss
  Common and Natural Logarithms
  Convert watts and milliwatts to dB and/or dBm
  Convert volts to dBW and vise versa
  Define and calculate dB
  Defining Decibels
  Equations using common logs
  Formulas for calculating decibels
  Identify the Base, the Log, and the Antilog
  Log whole numbers for the common logs with a logarithm chart
  Log fractions for the common logs with a logarithm chart
  Overall system operation signal strength
  References for dBW and dBm
  The dB formula to calculate the unknown value
  The dBm formula to calculate the unknown value
• EMI/EMC/EMP
  Identify EMI/EMC/EMP an their sources
  Production of EMI/EMC/EMP
  Reducing EMI/EMC/EMP
  State the electromagnetic spectrum

WHEN
Electromagnetic Interference/Electromagnetic Compatibility/Electromagnetic Pulse Testing
40-hour workshop, 4.0 CEUs, 8 a.m. - 5 p.m.
  Workshop #96-9196) Mon.-Fri., March 4-8
  Workshop #96-9197) Mon.-Fri., June 3-7
Pre-registration is required two weeks before workshop.
COST: $495 per participant

ELECTRONICS SEMINARS

ELECTRONICS PART I

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in an 80-hour workshop on Electronics Part I. This workshop will give the participant a better understanding of the fundamental principles of electricity. A comprehensive review of all necessary mathematical concepts is first presented, starting with decimals and fractions, and in an orderly development continues by steps to elementary plane trigonometry. After completing the development of math, participants are introduced to the fundamental concepts of electricity, starting with sources of electricity magnetism, and direct current theory.
During all phases of the program, participants are given opportunities to put their newly acquired theories to use through supervised practical exercises. Using a step-by-step procedure, the students are then taught the theories and uses of alternating current generation, and AC circuits, including impedance and resonance. During the final week, a complete review and examination are scheduled to further aid the participant in retaining the knowledge gained during the course. Prerequisite: Participants should have a knowledge of high school-level algebra.

WORKSHOP TOPICS
• Nature of electricity
• Resistance
• Ohms Law
• Series & parallel circuits
• Apply Kirchoffs' Laws to Series & Parallel Circuits
• Analyze series-parallel circuits
• Applying network circuit theorems
• Measurement devices
• Capacitors in DC circuits
• Investigate magnetism
• Inductors in DC circuits
• Exponential formulas and calculations to DC Circuits
• Charging and discharging rates for capacitive and inductive circuits
• AC waveforms
• Evaluate Reactance and its effect on the phase relationship between voltage and current in AC circuits
• Solve for voltage, current, impedance, and power
• Distribution in series, parallel and series-parallel circuits using Ohms' Law, Kirchoffs' and Watts' Laws
• Analyze transformer circuits and characteristics
• Analyze circuits at resonances
• Basic characteristics of common filters

WHEN
Electronics Part I, 80-hour workshop, 8.0 CEUs, 8 a.m. - 5 p.m.
  Workshop #96-9187) Mon.-Fri., April 19
  Workshop #96-9188) Mon.-Fri., July 15-26
Pre-registration required two weeks before workshop.
COST: $695 per participant
ELECTRONICS PART II

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a 80-hour workshop on Electronics Part II. This workshop will allow the participant to acquire the basic knowledge and principles involved in electronic circuits, semiconductors, integrated circuits and power supplies. Motors and other electronic items will be addressed in order for the student to understand the manufacturing processes associated with electronic equipment.

This workshop also includes the use of electronic measuring equipment and a large variety of common test equipment. Numerous hands-on laboratory exercises are included in the workshop to reinforce the learning process. Participants will complete an electronic project to keep. Prerequisite: Participants should have a good background in quality aspects of electrical and electronic commodities and must have completed Electronics Part 1 or have equivalent experience.

WORKSHOP TOPICS
• Semiconductor materials
  Silicon and germanium atoms & crystals
  Conduction in pure silicon & germanium
  Doping silicon & germanium
• Silicon & germanium diodes
  The PN junction
  Forward biased diode
  Reverse biased diode
  V-1 characteristics of diodes
• Diode characteristics: simplified & approximated
  The ideal diode
  Simplification of diode characteristics
  Reverse bias resistance of diodes
• Diode applications
  Super position of DC & AC
  Half-wave & full-wave rectifier
  Bridge rectifier
  Voltage doublers
• Zener diodes
  Zener characteristics
  Zener as regulators
• Bipolar junction transistor
  PNP & NPN junctions
  Relationship of Ic, Ib, le
• Common-emitter
  DC & AC consideration
  Cascaded stages
  AC load lines
• Common-Base Connection
  Super Position of DC & AC Signals
  Determining Voltage Gain & Current Gain
  High-Resistance Signal Source vs Gain
• Common-Collector
  Input-output characteristics
  Voltage and current gain
• Power Amplifiers
  Push-pull transformer coupled power amplifier
  Complimentary-paid outputs
  Temperature considerations
• Solid state devices
  FET, UJT, SCR, TRIAC, & DIAC
  Application, substitution & modification of circuit parameters

WHEN
Electronics Part II, 80-hour, 8.0 CEUs, 8 a.m. - 5 p.m.
Workshop #96-9189 Mon.-Fri., April 29-May 10
Workshop #96-9190 Mon.-Fri., August 19-30
Pre-registration required two weeks before workshop.
COST: $695 per participant.

FIRST AID AND CPR CERTIFICATION

INTRODUCTION
Any Campus USA's Seminars & Workshop invites you to participate in a 6-hour seminar on First Aid and Cardiopulmonary Resuscitation (CPR). This seminar will provide necessary training for National Safety Council Certification for First Aid and CPR Level I or II.

WHO SHOULD ATTEND?
Contractors, consultants, supervisors, managers, foremen, safety officers or coordinators, health care workers, general public or anyone else involved in activities that may require trained first aid and CPR persons.

SEMINAR TOPICS
• Adult CPR, child CPR, & infant CPR
• Airway obstruction
• Rescue breathing
• Bleeding control
• Muscle, bone & joint injuries
• Poisoning
• Shock
• Burns
• Heat/cold emergencies
• Stroke
• Diabetic emergencies
• Seizures
• Patient assessment

WHEN?
New! First Aid and CPR, 6-hour seminar, 0.6 CEUs, 9 a.m. - 3 p.m.
Seminar #(96-9212) Thursday, February 29
Seminar #(96-9213) Thursday, May 12
COST: $30 per participant.

HAZARDOUS MATERIALS CERTIFICATION SEMINARS

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a one-day seminar for Hazardous Material First Responder Awareness Level, or a three-day seminar for the Hazardous Material Technician or a one-day refresher. We also offer a five-day seminar for the Hazardous Wastesite Worker (HAZWOPER) or a one-day refresher. These seminars cover OSHA's 29 CFR 1910.120, Hazardous Wastesite Workers (HAZWOPER) Training.

All seminars meet all Environmental Protection Agency (EPA) requirements with a registered certificate number issued to participants upon successful completion.

WHO SHOULD ATTEND?
Safety officers, safety coordinators, human resource personnel, supervisors, pre-supervisors, foremen, management personnel, production personnel and other personnel who work around hazardous materials.

FIRST RESPONDER AWARENESS LEVEL

SEMINAR TOPICS
• OSHA's 29 CFR 1910.120 & Hazardous Material First Responder Awareness Level Training
Knowledge of the materials & procedures in process in the plant work area
Selection, use & limitation of personal protective equipment
Applied information from the MSDS used in the plant operations
Basic control, confirmation, and containment within resources & limits of the available emergency equipment
Basic decontamination procedures
Relevant standard operating procedures & shut-down processes

WHEN
First Responder Awareness Level, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar # (96-9124) Friday, February 16
Seminar # (96-9125) Friday, April 19
COST: $185 per participant

HAZARDOUS MATERIAL TECHNICIAN & REFRESHER SEMINARS

SEMINAR TOPICS
- OSHA's 29 CFR 1910.120 & Hazardous Material Technician Level Training
- How to initiate & implement the emergency response plan
- Identification of site materials & hazards
- Assigned roles in the incident command system
- Use and application of protective equipment & specialized containment of spill/clean-up materials
- Decontamination procedures used in the emergency response program
- Hazard & risk assessment techniques
- Proper use of shut-down procedures & evaluation of the affected areas
- Understanding basic chemical toxicology & the terms involved with behavioral response

WHEN
Technician, 24-hour seminar, 2.4 CEUs, 8 a.m. - 5 p.m.
Seminar # (96-9126) Wed. - Fri., February 28-March 1
Seminar # (96-9127) Wed. - Fri., May 29-31
COST: $210 per participant

Technician Refresher, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar # (96-9128) Tuesday, February 27
Seminar # (96-9129) Tuesday, May 28
COST: $185 per participant

HAZARDOUS WASTESITE WORKERS (HAZWOPER) & REFRESHER SEMINARS

SEMINAR TOPICS
- Hazard recognition, evaluation & control
- Toxicology/exposure guidelines
- Sources of information & assistance
- Monitoring & detection devices
- Protective clothing & equipment
- Site entry & control
- Decontamination procedures

WHEN
HAZWOPER, 40-hour seminar, 4.0 CEUs 8 a.m. - 5 p.m.
Seminar # (96-9130) Mon. - Fri., March 4-8
Seminar # (96-9131) Mon. - Fri., June 3-7
COST: $495 per participant

HAZWOPER Refresher, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar # (96-9132) Monday, February 26
Seminar # (96-9133) Monday, June 10
COST: $185 per participant

HM-126F TRANSPORTATION SAFETY

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in an 8-hour seminar on HM-126F Transportation Safety. This seminar is designed to reach personnel who are exposed to hazardous materials in an area such as a warehouse and loading docks. This seminar is developed to meet the requirements of Docket HM126F (49 CFR Parts 171-177). According to this rule, everyone who handles or transports packages containing hazardous materials must have safety training.

WHO SHOULD ATTEND?
Safety officers, safety coordinators, warehouse personnel, truckers, purchasing agents, consultants, supervisors, managers, foremen, and other personnel who work around hazardous materials where the potential for an accident exists.

SEMINAR TOPICS
- 49 CFR 172.101 table
- Marking, labeling and shipping papers
- Standard operating procedures
- Site-and function-specific safety training
- HM-181 transition progress

WHEN
New! HM-126F Transportation Safety, 8-hour, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar #(96-9227) Wednesday, April 17
Seminar #(96-9228) Wednesday, June 26
COST: $185 per participant.

ISO 9000 SEMINARS

INTRODUCTION
Any Campus USA's Seminars & Workshops invites you to participate in a one-day seminar on Internal Auditing Process for ISO 9000 or Understanding ISO 9000. These seminars are designed to help the participants become familiar with concepts and benefits of a quality standard that will provide their company with a competitive advantage.

INTERNAL AUDITING PROCESS FOR ISO 9000

WHO SHOULD ATTEND?
Engineers, quality personnel, manufacturing and production managers, supervisors and operators, as well as consultants and senior management. Employees of companies thinking about ISO registration should also attend.

SEMINAR TOPICS
- Quality Systems
- Auditing - Quality assurance systems
- Elements of the audit

WHEN
Internal Auditing Process for ISO 9000
8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar #(96-9201) Thursday, March 28
Seminar #(96-9202) Thursday, May 23
Seminar #(96-9203) Thursday, July 25
Pre-registration required two-weeks before seminar.
COST: $245 per participant. Registration fee includes lunch and a ISO 9000 notebook.
UNDERSTANDING ISO 9000

WHO SHOULD ATTEND?
Managers with no prior ISO training, quality managers, engineers and production supervisors, TQM team members, CEOs, owners and others interested in ISO 9000. Employees of companies thinking about ISO registration should also attend.

SEMINAR TOPICS
The seminar helps answer questions like
• What is ISO 9000? Is ISO 9000 for me?
• Why should I become registered?
• What is meant by the 20 elements of ISO 9001?
• How many parts are there in the ISO 9000 series?
• What is quality policy manual?
• What will ISO 9000 do for my company in terms of return on investment?
• Do I have to become registered?
• What is document control and how do I achieve it?
• What is management’s responsibility in the quality program?

WHEN
Understanding ISO 9000, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9198 Thursday, March 14
Seminar #96-9199 Thursday, May 9
Seminar #96-9200 Thursday, July 11
Pre-registration required two-weeks before seminar.
COST: $145 per participant. Registration fee includes lunch and a ISO 9000 handbook.

LEAD ABATEMENT CERTIFICATION SEMINARS

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a five-day seminar on Lead Abatement for Contractors/Supervisors or a one-day refresher.

The 32-hour seminar on Lead Abatement Worker Training is for workers who remove lead in the course of work. The seminar will provide information on lead-based paint abatement and regulatory guidelines. Abatement methods and strategies, worker protection procedures and waste disposal will also be discussed.

The 24-hour seminar on Lead Inspector Training is an intensive three-day seminar designed to primarily focus on inspection for lead-based paint. All other sources of lead exposure are also part of the curriculum. All seminars meet all Environmental Protection Agency (EPA) requirements with a registered certificate number issued to participants on successful completion.

WHO SHOULD ATTEND?
Contractors, supervisors, pre-supervisors, foremen, project leaders, consultants, safety officers, safety coordinators, inspectors, construction workers or anyone else interested in lead abatement.

CONTRACTORS/SUPERVISORS & REFRESHER

SEMINAR TOPICS
• Legal & insurance issues
• Hazard recognition & control
• Personal protective equipment
• Employee information & training
• Project management
• Waste disposal
• Lead paint abatement
• History of lead & its uses
• Regulatory review
• Interior dust abatement
• Oil & exterior dust abatement

LEAD ABATEMENT WORKER TRAINING

SEMINAR TOPICS
• Lead hazards
• Laws, regulations & standards
• Worker protection
• Control of lead hazards
• Special cleaning methods
• Abatement methods
• Cleanup, disposal & clearance
• Other health & safety problems
• Background information & health effects of lead
• Waste disposal

WHEN
Lead Abatement Worker Training
32-hour seminar, 3.2 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9140 Mon. - Thur., March 25-28
Seminar #96-9145 Tues. - Fri., June 11-14
COST: $395 per participant

LEAD INSPECTOR TRAINING

SEMINAR TOPICS
• Lead sources
• Regulatory background & guidelines
• Lead testings methods
• Testing other media for lead
• Field inspection methods
• Safety & effects of lead
• Sampling plan
• Personal protective equipment
• Recordkeeping

WHEN
Lead Inspector Training, 24-hour seminar, 3.2 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9146 Mon. - Wed., February 12-14
Seminar #96-9147 Mon. - Wed., May 20-22
COST: $450 per participant
LENDERS WORKSHOP FOR GUARANTY LOANS

INTRODUCTION

y Campus USA’s Seminars & Workshops and Any State’s Certified Development Company (CTCDC) invite you to participate in a one-day seminar featuring the state’s Agriculture Finance Authority’s “Added Value” Loan Guaranty Program and the Rural Economic and Community Development “Rural Business and Industry” Loan Guaranty Program. An in-depth presentation will be made on the particulars of these programs. Certified Public Accountant (CPA) attendee forms are available for record of satisfactory completion of Continuing Education credit applicable to the State Board of Public Accountancy.

WHO SHOULD ATTEND?
The workshop is directed at private-sector lenders to include presidents, chief executive officers and commercial loan officers. The workshop will also be of importance to certified public accountants, and others who are interested in business and economic development.

SEMINAR TOPICS

- Introduction to the RBI & TAFA programs
- Particulars of the programs
- Eligible borrowers and projects
- Application processing
- Underwriting criteria
- Lenders responsibility
- Secondary market potential
- A “Q&A” session

WHEN

Sponsors Workshop for Rural Guaranty Loans
One-hour seminar, 0.8 CEUs, 9 a.m. - 4 p.m.
Seminar # (96-9034) Friday, February 23
COST: $30 per participant. CDC Members $20

MINE SAFETY AND HEALTH SEMINARS

90-HOUR ELECTRICAL CERTIFICATION

INTRODUCTION

Any Campus USA’s Seminars & Workshops invites you to participate in a 90-hour seminar for Electrical Certification. This seminar is required by the Mine Safety and Health Administration (MSHA). An electrical experience application must be reviewed & approved by MSHA four weeks before the seminar.

WHO SHOULD ATTEND?
Any person who wants to work at a mine site as an electrician.

SEMINAR TOPICS

- Direct current theory & application
- Low and medium voltage theory & application
- National Electric Code (NEC)
- Electrical equipment & circuits
- Permissibility of electrical equipment
- Surface high voltage lines/transformers
- Trailing cables
- Electrical conductors & protection of power conductors for mobile equipment
- Circuit overload protection
- Controls and switches
- Electrical connections & resistor grids
- Grounding systems

WHEN

90-Hour Electrical Certification, 9.0 CEUs, 8 a.m. - 5 p.m.
Seminar # (96-9014) January 15-19, 22-26 & 29
Seminar # (96-9154) May 6-10, 13-17 & 20
COST: $695 per participant.

ANNUAL REFRESHER

WHO SHOULD ATTEND?
Any person who has completed the initial 24-hour Mine Safety and Health Newly Employed Miner training and must complete 8 hours of annual refresher training.

SEMINAR TOPICS

- Statutory rights of miners
- Self-rescue & respiratory devices
- Transportation controls & communications systems
- Introduction to the work environment
- Escape and emergency evacuation plans
- Fire warning & firefighting
- Ground control
- Health
- Hazardous recognition
- Electrical & energy source hazards
- First aid
- Health & safety aspects

WHEN

Annual Refresher, 8-hour Seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar # (96-9149) Wednesday, February 14
Seminar # (96-9150) Wednesday, March 20
Seminar # (96-9151) Wednesday, April 17
Seminar # (96-9152) Wednesday, May 15
Seminar # (96-9153) Wednesday, June 12
COST: $60 per participant.

ELECTRICAL ANNUAL REFRESHER

INTRODUCTION

Any Campus USA’s Seminars & Workshops invites you to participate in the one-day seminar, Mine Safety and Health Electrical Annual Refresher. This seminar is required by the Mine Safety and Health Administration (MSHA).

WHO SHOULD ATTEND?
Any person with an Mine Safety and Health Administration (MSHA) electrical certification who must complete 8-hours of electrical annual refresher training.

WHEN

Electrical Annual Refresher, 8-hour Seminar, 0.8 CEUs, 9 a.m. - 5 p.m.
Seminar # (97-9001) Wednesday, September 11
Seminar # (97-9002) Wednesday, October 2
Seminar # (97-9003) Wednesday, November 13
Seminar # (97-9004) Wednesday, December 11
COST: $60 per participant.

NEWLY EMPLOYED MINER—EXPERIENCED

INTRODUCTION

Any Campus USA’s Seminars & Workshops invites you to participate in a one-day seminar for the Newly Employed Miner - Experienced, or a three-day seminar on Mine Safety and Health for the Newly Employed Miner - Inexperienced. These seminars are required by the Mine Safety and Health Administration (MSHA).

WHO SHOULD ATTEND?
Any newly employed person that is experienced in their career field and required to work at a mine site.
SEMINAR TOPICS
- Introduction to the work environment
- Mandatory health & safety standards
- Authority and responsibility of supervisors & miner’s representatives
- Transportation controls & communication systems
- Escape & emergency evacuation plans; fire warning & firefighting
- Ground controls; working in areas of highwalls, water hazards, pits & spoil banks; illumination & night work
- Hazard recognition

WHEN
Experienced, 6-hour seminar, 0.6 CEUs, 9 a.m. - 3 p.m.
Seminar #96-9157 Wednesday, February 14
Seminar #96-9158 Wednesday, March 20
Seminar #96-9159 Wednesday, April 17
Seminar #96-9160 Wednesday, May 15
Seminar #96-9161 Wednesday, June 12
COST: $60 per participant.

NEWLY EMPLOYED MINER–INEXPERIENCED

WHO SHOULD ATTEND?
Any newly employed person that is required to work at a mine site.

SEMINAR TOPICS
- Statutory rights of miners
- Self-rescue & respiratory devices
- Transportation controls & communication systems
- Introduction to the work environment
- Escape & emergency evacuation plans
- Fire warning & firefighting
- Ground control
- Health
- Hazardous recognition
- Electrical & energy source hazards
- First aid
- Health & safety aspects
- Hazardous recognition
- Electrical & energy source hazards
- First aid

WHEN
Inexperienced, 24-hour seminar, 2.4 CEUs, 9 a.m. - 5 p.m.
Seminar #96-9155 Tues. - Thurs., March 26-28
Seminar #96-9156 Tues. - Thurs., June 25-27
COST: $150 per participant.

TRAIN-THE-TRAINER

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a three-day seminar on Mine Safety and Health Train-The-Trainer Seminar. This seminar is required by the Mine Safety and Health Administration (MSHA) for instructors.

WHO SHOULD ATTEND?
Any person who wants to become an instructor for Mine Safety and Health Administration (MSHA) courses.

SEMINAR TOPICS
- Analyze training requirements
- Writing training objectives
- Outlining a training plan
- Preparing a training plan
- Developing presentation skills

WHEN
Train-The-Trainer, 24-hour seminar 2.4 CEUs, 9 a.m. - 5 p.m.
Seminar #96-9148 Tues. - Thurs., August 6-8
COST: $245 per participant.

OPTICS SEMINARS

FUNDAMENTAL PRINCIPLES OF OPTICS

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to attend a 40-hour seminar on Fundamental Principles of Optics. This intense five-day seminar includes theory and 50 percent hands-on exercises in the labs of Laser Electro-Optics Technology. Seminar participants will receive textbooks. Participants will be required to bring their own scientific calculator and must have a working knowledge of basic algebra and trigonometry.

WHO SHOULD ATTEND?
Inspectors, quality assurance personnel and supervisors

SEMINAR TOPICS
- Introduction to the fundamental principles of optics
- Optical tables & benches
- Windows
- Mirrors, flats & etalons
- Filters & beam splitters
- Reflection at plane & spherical surfaces
- Refraction at plane surfaces
- Prisms
- Refraction at spherical surfaces
- Lenses
- Imaging with simple & multiple lenses
- F-stops & apertures
- Optical systems
- Gratings
- Polarizers

WHEN
Fundamentals Principles of Optics
40-hour seminar, 4.0 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9181 Mon. - Fri., February 26-March 1
Seminar #96-9182 Mon. - Fri., May 20-24
Pre-registration is required two-weeks before seminar.
COST: $495 per participant.

OPTICAL TOOLING SEMINAR

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in an 80-hour seminar on Optical Tooling. This ten-day seminar includes theory and hands-on lab exercises. Participants will become familiar with the descriptive characteristics, principles, basic instrument usages, and calibration verification procedures of optical tooling and optical quality testing.

WHO SHOULD ATTEND?
Inspectors, quality assurance personnel and supervisors

PREREQUISITE
Participants must have no serious visual defects, particularly astigmatism that could result in inaccurate reading of optical instruments. A knowledge of mathematics through geometry is required.

WHEN
Optical Tooling, 80-hour seminar, 8.0 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9183 Mon. - Fri., March 18-29
Seminar #96-9184 Mon. - Fri., June 10-21
Pre-registration is required two-weeks before seminar.
COURSE LENGTH: Ten 8-Hour days for a two-week period.
COST: $695 per participant.
FIBER OPTICS WORKSHOP

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a 40-hour workshop on Fiber Optics. This workshop is designed to give the participant a working knowledge and a basic understanding of the use, installation fabrication, basic design, and components of the fiber optic systems. This workshop includes numerous hands-on laboratory exercises to reinforce the learning process.

WHO SHOULD ATTEND?
Technicians who work with fiber optic cables or those who want a working knowledge of fiber optics.

WORKSHOP TOPICS
- Introduction to fiber optics
- The properties of light
- Optical fiber
- Characteristics of fiber optics
- Fiber optic cables
- Applications for fiber optics

WHEN
Fiber Optics, 40-hour workshop, 4.0 CEUs, 8 a.m. - 5 p.m.
Workshop #96-9185 Mon.-Fri., March 4-8
Workshop #96-9186 Mon.-Fri., June 3-7
Pre-registration is required two weeks before seminar.
COST: $495 per participant.

WELDING SEMINARS

INTRODUCTION
Any Campus USA’s Seminars & Workshops invites you to participate in a 36-hour seminar for Certified Welding Inspector Test Preparation. This seminar is designed to prepare the participant for the American Welding Society’s (AWS) Certified Welding Inspector (CWI) examination.

The 8-hour seminar on Flux Core Metal Arc Welding (FCAW). Gas Metal Arc Welding (GMAW/MIG) and Gas Tungsten Arc Welding (GTAW/TIG) are designed to help the participant maximize the productivity of welding processes.

The 32-hour seminar on Introduction To Welding Equipment Troubleshooting and Repair is designed to introduce maintenance personnel and supervisors, who have responsibility for welding equipment, to the specifics of welding equipment troubleshooting repair.

The 8-hour seminar on Welding Safety is designed for the participant to be able to use various welding and cutting processes in a manner which is in compliance with OSHA standards, and to recognize safe and unsafe practices.

WHO SHOULD ATTEND?
Welders, technicians, engineers, inspectors, supervisors, foremen, quality control and assurance personnel who are involved with the welding processes.

CERTIFIED WELDING INSPECTOR (CWI) TEST PREPARATION

SEMINAR TOPICS
- Qualification of the welding inspector
- Process equipment & setup
- The three types of metal transfer and when to use each
- How to set the machine for optimum production
- How to control bead appearance
- What the American Welding Society’s (AWS) Structural Welding Code D1.1 says about FCAW
- How to develop and improve your welding procedures

WHEN
Certified Welding Inspector (CWI) Test Preparation
36-hour seminar, 3.6 CEUs
Seminar#96-9162 Mon.-Fri., January 15-19
Seminar#96-9163 Mon.-Fri., March 11-15
Seminar#96-9164 Mon.-Fri., May 13-17
COST: $400 per participant. Minimum of 10 participants required.
Seminar Training Times:
Monday, 1 - 6 p.m.
Tues. - Thur., 8 a.m. - 6 p.m.
Friday, 8 a.m. - noon

FLUX CORE ARC WELDING

SEMINAR TOPICS
- Introduction to flux core arc welding (FCAW)
- Process equipment & setup
- Gasless flux core arc welding
- How to set the machine for optimum production
- How to control bead appearance
- What the American Welding Society (AWS) Structural Welding Code D1.1 says about FCAW
- How to develop and improve your welding procedures

WHEN
Flux Core Arc Welding, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9167 Wednesday, February 7
Seminar #96-9168 Wednesday, April 3
Seminar #96-9169 Wednesday, June 5
COST: $95 per participant.

GAS METAL ARC WELDING

SEMINAR TOPICS
- Introduction to gas metal arc welding (GMAW/MIG)
- Process equipment & setup
- The three types of metal transfer and when to use each
- How to set the machine for optimum production
- How to control bead appearance
- What the American Welding Society’s (AWS) Structural Welding Code D1.1 says about GMAW/MIG processes
- How to develop and improve your welding procedures

WHEN
Gas Metal Arc Welding, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar #96-9170 Wednesday, February 14
Seminar #96-9171 Wednesday, April 10
Seminar #96-9172 Wednesday, June 12
COST: $95 per participant.

GAS TUNGSTEN ARC WELDING

SEMINAR TOPICS
- Introduction to Gas Tungsten Arc Welding (GTAW/TIG)
- Process equipment & setup
- How to set up to weld various metals including stainless steel, aluminum & magnesium
- How to set the machine for optimum production
- How to control bead appearance
- What the American Welding Society Mechanical Engineer (ASME) Boiler & Pressure Vessel Code says about GTAW/TIG
- How to develop and improve your welding procedures


WHEN
Gas Tungsten Arc Welding, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar #(96-9173) Wednesday, March 6
Seminar #(96-9174) Wednesday, May 1
Seminar #(96-9175) Wednesday, July 10
JST: $95 per participant.

INTRODUCTION TO WELDING EQUIPMENT TROUBLESHOOTING & REPAIR

SEMINAR TOPICS
- Review of the major arc welding processes
- Troubleshooting shielded metal arc welding equipment
- Troubleshooting flux core arc welding equipment
- Troubleshooting gas metal arc welding equipment
- Troubleshooting gas tungsten arc welding equipment
- Troubleshooting submerged arc welding equipment

WHEN
Introduction To Welding Equipment Troubleshooting & Repair
32-hour seminar, 3.2 CEUs, 8 a.m. - 5 p.m.
Seminar #(96-9165) Mon.-Thurs., February 26-29
Seminar #(96-9166) Tues.-Fri., May 28-31
COST: $395 per participant.

WELDING SAFETY

SEMINAR TOPICS
- Introduction to welding & cutting processes
- Introduction to welding & cutting Safety
- Hazards
- Preventive & protective measures
- Arc welding safety
- Fire prevention
- Hearing protection
- Respiratory protection
- OSHA safety standards for welding and cutting
- 1926.350 gas welding & cutting
- 1926.351 arc welding & cutting
- 1926.352 fire prevention
- 1926.353 ventilation & protection in welding, cutting & heating
- 1926.354 welding, cutting and heating in way of preservative coatings

WHEN
Welding Safety, 8-hour seminar, 0.8 CEUs, 8 a.m. - 5 p.m.
Seminar #(96-9176) Wednesday, March 20
Seminar #(96-9177) Wednesday, May 8
Seminar #(96-9178) Wednesday, July 17
COST: $95 per participant.

ENVIRO-SAFE CONFERENCE & EXPO

INTRODUCTION
Any Campus USA invites you to participate in a 3-day Environmental & Safety Conference and Exposition on September 17, 18 & 19 at the Convention Center. Come and see what's new in '96 and what the future holds for '97 for industry professionals in safety and environmental areas. This conference will include presentations by professional leaders who are experts in safety and environmental fields.

WHO SHOULD ATTEND?
Business persons, engineers, environmental personnel, safety personnel, energy consultants, and other safety and environmental professionals.

WORKSHOPS
- Open forum on September 16, by TNRCC & TWCC
- Generators of Hazardous Waste
- Construction Safety (10 hours- U.S. Dept. of Labor)
- Confined Space/Fall Protection
- Hazard Communications
- Workplace Violence
- Processing Tier II Reports
- Ergonomics
- ISO 9000 & ISO 14000
- Workers' Compensation-Occupational Illnesses & Recordkeeping
- Agricultural Chemical & Equipment Safety-Applicators Licence
- Voluntary OSHA Guidelines
- Bio-Remediation
- Supervisors' Safety Course for Small Businesses
- Blood Borne Pathogens & Other Communicable Diseases
- Radon
- Low-Level Radioactive Waste-Scrap Metal Industry
- Environmental Liability
- Alternative Fuels
- HAZWOPER Refresher - 8 hours
- And many offering CEUs and certificates for all workshops

A booklet of class schedules will be forthcoming in the Spring of 1996.

ATTENTION ATTENDEES
EARLY REGISTRATION ENDS APRIL 1
- Fee includes all presentations, lunches, breaks, seminars and materials
- Cancellation & refund no later than August 1

ATTENTION EXHIBITORS
- Late registration fee per booth $50
- Set up: September 16 — 1 to 10 p.m.
- One full conference pass to all exhibits
- Unlimited exhibit hall passes

CANCELLATION AND REFUND NO LATER THAN AUGUST 1

For more information or to reserve a space call 232
AREAS OF TRAINING EXPERTISE

- Air Conditioning & Refrigeration
- Aircraft Pilot Training
- Asbestos
- Audio Visual Production
- Auto Collision & Repair
- Automated Manufacturing
- Automated Office
- Automotive Technology
- Aviation Maintenance
- Aviation Structures
- Avionics
- Biomedical Equipment
- Building Construction
- Business & Management
- Chemical Technology
- Commercial Art & Advertising
- Computer Networking and Systems Administration
- Computer Systems/Networking
- Computer Science
- Dental Assistant
- Diesel Mechanics
- Electrical Systems Technology
- Electronic Servicing
- Electronic Technology
- Emergency Medical/Paramedics
- Environmental
- Fiber Optics
- Food Service/Culinary Arts
- Golf Course & Turf Grass Management
- Graphic Imaging Systems
- Hazardous Materials Management
- Heavy Truck & Construction Equipment
- Industrial Maintenance Mechanics
- Industrial Management
- Instrumentation
- Interior Design
- ISO 9000
- Laser Electro-Optics
- Laser Safety
- Machining
- Manufacturing Engineering Technology
- Meat Processing & Marketing
- Mechanical Engineering Technology
- Mechanical Electrical Technology
- Medical Records Clerk
- Medical Transcription
- Metrology
- Millwright
- Mine Safety & Health Administration (MSHA)
- Nondestructive Evaluation
- Occupational Safety & Health
- Pipefitting
- Plant Engineering
- Plastics Manufacturing
- Professional Truck Operations
- Radiation Protection
- Radio Communication Electronics
- Robotics
- Semiconductor Manufacturing
- Telecommunications
- Television Servicing
- Time Management
- Vacuum Techniques
- Vocational Nursing
- Welding
REGISTRATION

All registration fees are due prior to the start of the seminar. Advance registration guarantees your reservation and eliminates check-in delays. Once your advance registration is complete, we will immediately send you a Confirmation Notification, which will include information about accommodations, a campus map and seminar location. All seminar fees include handouts, workshop instructions and coffee breaks. Any Campus USA reserves the right to cancel a class if a minimum number of students do not register. Enrollment will be on a first-come, first-serve basis.

TAX DEDUCTION. An income tax deduction may be allowed for education expenses undertaken to maintain or improve professional skills. This includes registration, travel, meals, lodging, etc. Please contact your accountant for complete details.

Cancellation. We understand that circumstances may arise that require you to cancel. If you cancel your registration up to five business days before the seminar, your registration fee will be refunded less a $10 enrollment charge. If your cancellation is received less than five business days before the seminar, you may send a substitute or receive a credit memorandum good for one year toward another seminar of equal value.

SEMINAR INFORMATION

☐ "We have entered into an agreement with the State Board of Public Accountancy to meet the requirements of continuing education rules covering maintenance of attendance records, retention of program outlines, qualifications of instructors, program content, physical facilities, and length of class hours. This agreement does not constitute an endorsement by the Board as to the quality of the program or its contributions to the professional competence of the licensee." Continuing Education Sponsor ID# 06502, Any Campus USA, Seminars/Workshops.

☐ Members of the ANY CAMPUS USA Alumni Association will be eligible for a discount with current identification card.

☐ “Reasonable arrangements for persons with disabilities will be made if requested at least two weeks in advance.”

ODGING

Manor House Inn is the host hotel for ANY CAMPUS USA Seminars & Workshops participants. The following information is a list of the amenities offered:

- Continental Breakfast
  Includes: Coffee, orange juice, a variety of cereals, milk, bagels, danishes, and fresh fruits
- Free Local Calls
- City-Wide Shuttle Service
  Complimentary Services Available:
  7:30 a.m. until 10:00 p.m. Monday - Saturday
  7:30 a.m. until 4:00 p.m. Sunday
- Free Golf at the Country Club
- On-Site Sports Grill
- Large Outdoor Pool
- Finest Hospitality!

Manor House Inn offers a special rate of $49.00 for ANY CAMPUS USA training participants. The hotel is conveniently located near shopping centers, restaurants, and movie theaters. Based on availability, reservations can be made by calling 1-800-772-9440.

For Further Information: If you would like to be on the mailing list for Seminar Catalog or the Seminar Monthly Schedules, Please call SEMINARS & WORKSHOPS

Fax: ___________________________
Seminar Registration Form

(Please duplicate for group registration)

YES! I WANT TO ATTEND A SEMINAR/WORKSHOP!

Please enroll me in:

1. Seminar Title: __________________________
2. Seminar #: ____________________________
3. Seminar Date: __________________________
4. Seminar Registration Fee: __________________________

Name of Attendees:

1. Mr./Ms. ____________________________ Title: __________________________
2. Mr./Ms. ____________________________ Title: __________________________
3. Mr./Ms. ____________________________ Title: __________________________

Company: __________________________

Business Address: __________________________

City: __________________________ State: __________________________ Zip: __________________________

Business Phone: (________) Business Fax: (________)

METHOD OF PAYMENT:

☐ My check or purchase order, made out to Any Campus USA, is enclosed.

☐ Please charge ______ registration(s) to my credit card. Check one.

Cardholder's Name: __________________________

Signature: __________________________

To register... Call toll-free or FAX the completed registration form to: or MAIL the form to:

Any Campus USA
Seminars/Workshops

Can Any Campus USA help you?

☐ If you are interested in a particular seminar or workshop that is not listed, please give us a call. If there is a need, we may be able to offer it in the future.

☐ If you want an on-site training program, please give us a call.

☐ Any Campus USA is charged with facilitating economic development throughout the state by providing a wide range of services and training. Assistance includes assessment of employee training needs, curriculum development, preparation of instructional materials, testing and evaluation of employees, as well as development of training strategies. Specialized contract training in almost every field from welding to laser electron-optics has been offered throughout the state.

☐ Training can be provided for New Plant Startup and Plant Expansion, Journeyman Upgrade, Displaced Workers, and Workplace Literacy. Industrial training also encompasses the development of related duty and task inventories and the creation of job descriptions. Descriptions of job-specific written and practical tests for assessing workforce skills, determining training needs, testing new hires and career advancement are also provided. Consultation services in engineering, craft, or management are a part of the total service of Any Campus USA.

PLEASE GIVE US A CALL AT ________________

Seminars & Workshops

Attention Mailroom Personnel:

If undeliverable as addressed, please route to your training director.

NON-PROFIT ORG.
U.S. POSTAGE PAID
PERMIT NO.
YOUR COLLEGE TO HOLD INDUSTRIAL TRAINING SEMINARS/WORKSHOPS

YOUR COLLEGE, in cooperation with LOCAL INDUSTRY, is presenting a one-day seminar on INDUSTRIAL TRAINING TOPIC. Training will be held on DATE and TIME.

The seminar/workshop will include in-depth training in the specific skills which the company has requested. (This could be any one or more of the MAST Remote Site Training Modules.)

The seminar/workshop will be held at LOCATION and the COST is $$$. Lunch will/will not be provided.

The seminar/workshop is intended for TARGET PARTICIPANTS. Participants receive Continuing Education Units (CEUs) and a YOUR COLLEGE certificate upon completion of the workshop.

For more information, contact COLLEGE TRAINING REPRESENTATIVE at Phone Number.

This paragraph could include some information about YOUR COLLEGE. It can serve as a marketing tool for further training. (For example: "YOUR COLLEGE is a leading center for industrial/vocational training in the state. With over 40 instructional programs in the most critical technology areas, YOUR COLLEGE is preparing a workforce to meet the demands of business and industry. For more information call COLLEGE Phone Number.")

Figure R-5
Appendix B.....of the MAST Remote Site/Industrial Training Model contains the documentation which is recommended to aid in the planning and implementation of the seminar/workshop or training program.
1. PLANNING
   - Budget, finances
   - Public relations
   - Seminar training date selection
   - Facilities/food
   - Countdown time line
   - "To do" lists
   - Responsibility plan
   - Follow-up report
   - Mailing lists

2. PUBLIC RELATIONS
   - Training policy statement
   - Newsletters
   - Brochure
   - Audio-visual media
   - Catalogs
   - Notify college telephone operators
   - Bulletins/announcements/news releases
   - Electronic mail & electronic bulletin boards

3. FACILITIES
   - Instructional programs
   - Industrial Training Department
   - Student center
   - Others

4. SCHEDULES
   - Master schedule
   - Weekly schedule
   - Monthly schedule
   - Daily seminar agenda

5. REFRESHMENTS & LUNCHES
   - Coffee breaks
   - Payment
   - Lunch facilities
   - Restaurant listings
   - Menu

6. ACCOMMODATIONS
   - On-campus housing
   - Hotel listings

7. REGISTRATION
   - Seminar enrollment form
   - Telephone/fax/mail
   - Seminar enrollment confirmation
   - Campus map
   - Seminar information brochure

8. MAILING LIST
   - Advisory committee members
   - College employees
   - Associations/society members
   - Past seminar participants
   - College former students
   - Industrial training clients

Figure R-6
9. CHECKLISTS
   - Publicity
   - Food
   - Public address equipment
   - Speakers
   - Planning
   - Registration
   - Billing
   - Time sheets
   - Mailing lists
   - Accommodations
   - Visitor literature
   - Audio-visual media
   - Facilities
   - Audio visual equipment
   - Follow-up
   - Schedules
   - Evaluations
   - Letter of Agreement
   - Files
   - Certifications
   - Publication
   - Parking/security/telephone operator

10. LETTER OF AGREEMENT
    Letter of Agreement with instructor

11. TIME SHEET & PAYROLL
    Time sheet form
    Payroll verification

12. FILES
    - Planning
    - Clients
    - Mailing lists
    - Resumes/biography
    - Seminar registration fee credit
    - General information (budget, facilities, insurance, personnel, etc.)
    - Courses (objectives, topic outlines, lessons, evaluation)
    - Schedules
    - Marketing
    - Consultants
    - Seminar attendance roster
    - Registration deposits

13. PUBLICATIONS
    - Participant workbook
    - Handbooks
    - Manuals
    - Audio cassettes
    - Videocassettes
    - Video-base instruction system

14. VISITOR LITERATURE
    - City tourist package
    - College package
    - Industrial training package
    - Seminar brochures
    - Seminar catalogs

15. INVOICING
    - Course attendance check
    - Invoicing records

16. PARKING/SECURITY/TELEPHONE OPERATOR
    - Notify security about seminar
    - Notify telephone operators
    - Parking permits for participants

17. CERTIFICATES
    - Course registration information
    - Certificate form
18. EVALUATION
   Seminar evaluation form
   Instructor's evaluation of the course
   Director's narrative report

19. CONDUCT SEMINAR
   Registration
   Receipt of fees
   Name badges
   Desk name cards
   Check refreshments
   Check facilities
   Check audio visual equipment
   Distribute seminar handout/booklet

20. FOLLOW-UP
   Prepare & send list of attendees to all attendees
   Thank speakers and other key participants
   Pay final bills
   Synthesize evaluation comments and other feedback
   Prepare a brief narrative report for the file
   Record attendance data
   Verify payment of instructor
SEMINARS/WORKSHOP PERSONNEL

1. MANAGEMENT
   - Budget, finances
   - Registration
   - Evaluation
   - Public relations
   - Message center
   - Correspondence
   - Recruit instructors for seminars
   - Market new seminars
   - Schedule deadlines
   - Mailing lists
   - Planning
   - Letter of Agreement

2. PROGRAM
   - Schedule plan
   - Seminar content/topic outline
   - Seminar booklet
   - Exhibits
   - Certificates
   - Registration at seminar’s first day
   - Seminar name/desk tags
   - Seminar attendance roster
   - Seminar checklist finalize

3. FACILITIES/FOOD/ACCOMMODATIONS
   - Meeting rooms
   - Meals, coffee breaks
   - Accommodations
   - Parking/security/telephone operators
   - Transportation
   - Message center

4. CLERICAL SUPPORT
   - Seminar registration
   - Telephone
   - FAX
   - Mail
   - Receptionist
   - Reservationist
   - Confirmations
   - Files
   - Mailing lists
   - Invoicing
   - Typing
   - Computer specialist
   - Certificates
   - Seminar registration fee credit
   - Messages
   - Public relations

Figure R-7
PLANNING ACTIVITIES

EIGHTH WEEK
___ 1. Determine sponsor
___ 2. Choose title
___ 3. Identify instructor
___ 4. Identify objectives
___ 5. Identify audience
___ 6. Estimate expected audience attendance
___ 7. Determine seminar date
___ 8. Estimate registration fee
___ 9. Determine start & ending time
___10. Determine breaks & lunch periods
___11. Is lunch included in registration fee?
___12. Choose training facilities
___13. Any special requests
___14. Prepare a preliminary agenda
___15. Determine seminar responsibility plan

SEVENTH WEEK
___16. Contact instructor
___17. Determine publication needs
___18. Determine audio visual needs
___19. Get mailing list
___20. Finalize agenda
___21. Prepare a biography on instructor(s)
___22. Finalize registration fee
___23. Prepare a brochure

SIXTH WEEK
___24. Prepare a Letter of Agreement
___25. Schedule seminar into master training schedule
___26. Prepare final program schedule & agenda
___27. Finalize brochure
___28. Arrange for coffee breaks & lunches
___29. Print mailing labels
___30. Mail out brochure
___31. Send final agenda & brochure to instructor

FIFTH WEEK
___32. Release media announcements
___33. Receive registrations

Figure R-82
34. Mail out confirmations
35. Notify public safety & telephone operators
36. Prepare any booklet or handouts
37. Review enrollment data

FOURTH WEEK
38. Receive registrations
39. Mail out confirmations
40. Review seminar plans with instructor
41. Show instructor facilities
42. Determine all room set-ups
43. Review instructor’s classroom needs
44. Review seminar responsibilities with staff
45. Review enrollment data
46. Review checklist

THIRD WEEK
47. Receive registrations
48. Mail out confirmations
49. Generate seminar roster
50. Confirm count for breaks & lunch
51. Establish sigh-in procedures
52. Review enrollment data
53. Review checklist

SECOND WEEK
54. Receive registrations
55. Mail out confirmations
56. Design & print evaluation forms
57. Verify/confirm facilities usage
58. Confirm seminar with public safety & telephone operators
59. Update seminar roster
60. Print participant name tags
61. Review enrollment data
62. Review checklist

FIRST WEEK
63. Receive registrations
64. Mail out confirmations
65. Update seminar roster
66. Prepare seminar packages
67. Verify instructor & materials
68. Finalize instructor package
69. Finalize booklet or handouts
70. Review enrollment data
71. Review all checklist
SEMINAR WEEK

72. Receive registrations
73. Telephone/fax confirmations
74. Finalize seminar roster
75. Review enrollment data
76. Confirm checklists are complete
77. Distribute seminar package
78. Distribute College literature
79. Distribute city visitor literature
80. Media coverage
81. Seminar registration process
82. Collect seminar registration fees
83. Collect evaluations
84. Prepare a seminar follow-up report
REQUEST FROM BUSINESS AND INDUSTRY

DATE:__________________

NAME:__________________

TITLE:__________________

COMPANY:__________________

MAILING ADDRESS:__________________

CITY:__________________ STATE:__________________ ZIP:__________________

PHONE#: (____)______________ FAX#: (____)______________

INTERESTS AND COMMENTS:

________________________________________

________________________________________

________________________________________

________________________________________

INITIAL CONTACT:__________________

ASSIGNED TO:__________________

APPOINTMENT:__________________

DATE:__________________ LOCATION:__________________

TIME:__________________

Figure R-9
SEMINAR REGISTRATION FORM
(Please duplicate for group registrations)

YES! I WANT TO ATTEND A SEMINAR/WORKSHOP!

Please enroll me in:
1. Seminar Title: __________________________ 
2. Seminar #: __________________________ 3. Seminar Date: __________________________ 
4. Seminar Registration Fee: ____________ 5. Campus Housing: ___ Nights@$20.= ____________

Name of Attendees:
1. Mr./Ms. __________________________________________________ Title: __________________________
2. Mr./Ms. __________________________________________________ Title: __________________________
3. Mr./Ms. __________________________________________________ Title: __________________________

Company: __________________________________________________
Business Address: __________________________ City: __________ State: __________ Zip: __________
Business Phone: (____) __________ Business Fax: (____) __________

Method of Payment:
____ My check or purchase order, made out to YOUR COLLEGE, is enclosed.
____ Please charge ___ registration(s) to my credit card. Check one.
____ Master Card __________ VISA __________ Other (specify) __________________________

Cardholder's Name __________________________________ Signature __________________________

To register...Call toll-free 1-800-_________ or FAX the completed registration form to: (____) Phone #
or (___) FAX # _____ COLLEGE NAME ________
College Address

Can OUR COLLEGE help you?
____ If you are interested in a particular seminar or workshop that is not listed, please give us a call.
____ If there is a need, we may be able to offer it in the future.
____ If you want an on-site training program, please give us a call.
____ If you need assistance with assessing employee training needs, curriculum development,
preparation of instructional materials, testing and evaluation of employees as well as developing
training strategies. Specialized contract training in almost every field has been offered.
____ Training can be provided for New Plant Startup, Plant Expansion, Journeyman Upgrade,
Displaced Workers, and Workplace Literacy.
____ Consultation services are available to develop related duty/task inventories and job description
creation. Testing of new hires, assessing work force skills and career advancement are also
provided.

PLEASE GIVE US A CALL AT 1-800-YOUR COLLEGE

Figure R-10
SEMINAR & WORKSHOP
ENROLLMENT CONFIRMATION

Name of Enrolled Trainee: ____________________________
Seminar(s) Enrolled In: ____________________________

Daily Times: _____________________________________
Seminar Location: _________________________________

Please retain this enrollment notice and present it on the first day of the seminar class.

___ Seminar Cancelled
(If a seminar is not held for ANY reason, the college's liability is limited to the seminar fee.)

___ Seminar Rescheduled
Date: _____________________

If you cannot attend this seminar, please notify the Seminars & Workshop department at least 10 days before the seminar is due to begin. The full tuition fee will be refunded less a $10 processing fee. Otherwise, the full payment will be converted to a non-refundable credit which can be applied toward any seminar up to one full year.

Trainee substitutions are permissible provided the substitute trainee has met the seminar prerequisites.

Continuing Education Units (CEUs) will be issued to each trainee upon successful completion of the seminar.

Certified Public Accountant (CPA) attendance forms are available for record of satisfactory completion of the Continuing Education credit applicable to the State Board of Public Accountancy.

The expense of continuing education, when taken to maintain and improve professional skills, is tax deductible. Please contact your accountant for complete details.

If you have any questions, please contact the college representative
COLLEGE NAME, ADDRESS AND PHONE

Thank you for your interest in our Seminars & Workshops!

Figure R-11
SAMPLE HOTEL/MOTEL ACCOMODATIONS

WACO, TEXAS
HOTEL/MOTEL ACCOMODATIONS
COURTESY OF THE WACO CONVENTION & VISITORS BUREAU
1-800-WACO-FUN/1-800-822-6236 In local area: (979) 750-8686

- BED & BREAKFAST
  - T.C. Motel
  - Longhorn Lodge
- MOTELS
  - BEST WESTERN OLD MAIN LODGE
  - BEST WESTERN WACO HOLIDAY
- INN
  - YOUTH HOSTEL
- LODGE
  - VICTORIAN INN
- MOTOR INN
  - ISLA CARA
- INN
  - INNISPIRE
- CASINO
  - LA VISTA INN
-gem
  - MENS
- COURTESY OF THE WACO CONVENTION & VISITORS BUREAU
1-800-WACO-FUN/1-800-822-6236 In local area: (979) 750-8686

Figure R-12
### FACILITY RESERVATION FORM

**Date Confirmed:**

- **Tentative**

**Name:**

- [ ]

**Phone:**

- [ ]

**Department/Organization:**

- [ ]

**Address:**

- [ ]

**City**

- [ ]

**State**

- [ ]

**Zip**

- [ ]

**TSTC Contact:**

- [ ]

**Type of Function:**

- [ ]

**Estimated Attendance:**

- [ ]

**Date & Time:**

- [ ]

#### FACILITY ARRANGEMENTS

**Room Configuration:** (See examples on reverse side)

- [ ] Theater (seats 125 maximum)
- [ ] U-Shape (outside seating) (seats 30 maximum)
- [ ] Classroom (with tables) (seats 70 maximum)

**Microphone:**

- [ ] On Lectum
- [ ] Hand Held
- [ ] Lavaliere (clip-on)

**Audiovisual Materials:**

- [ ] Satellite Downlink
- [ ] Video Monitor
- [ ] Flipchart & Stand
- [ ] Overhead Projector & Screen
- [ ] Slide Projector & Screen

**Instructions and/or Other Needs:**

I hereby approve the arrangements as shown and fully understand the IDEAS Center policies as stated on the reverse side of this form.

---

*Figure R-13*
• The IDEAS Center is a designated non-smoking area.

We will provide a technician to operate the satellite, VCR, monitors, and microphone system.

• Acquisition of equipment that the IDEAS Center does not have available will be the responsibility of the person(s) reserving the room.

• To ensure the best possible service, final confirmation of the reservation must be made one week prior to the event by the requester.

• All copyright procedures must be adhered to during satellite downlinking.

EXAMPLES OF ROOM CONFIGURATIONS

Theater Style

U-Shape Style

Classroom Style
### Alternative room layouts

1. Classroom (Standard)
2. U-shape (Smaller group)
3. Herringbone (Large group)
4. Herringbone (Small group)
5. Herringbone (Group participation & discussion)
6. Rounds (Small groups)

---

**NOTES:**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
REFRESHMENT / LUNCH
ARRANGEMENT FORM

INSTRUCTOR: ___________________________  FUNCTION: ___________________________

ORGANIZATION: _________________________  HOST(ESS): _________________________

DATE OF FUNCTION: _____________________  TIME OF FUNCTION: _____________

NUMBER OF GUESTS: _____________________  TYPE OF SERVICE: _______________

PRICE: $____________ per person  HEADTABLE: _______________________

BILL TO: ____________________________________________

_____________________________________________________

MENU:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

SPECIAL SERVICE REQUEST(S): ________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

PERSON TAKING CALL: __________________________

DATE & TIME OF CALL: __________________________

Figure R-14

252
### SEMINAR CLASS ENROLLMENT

<table>
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<tr>
<th>Seminar Name:</th>
<th>Seminar Number</th>
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<tbody>
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<td>Social Security #</td>
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<tr>
<td>Home Address</td>
<td>City</td>
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<td>Employer (Company Name)</td>
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<td>Marital Status (Optional)</td>
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<td>Sex (Optional)</td>
<td>Male</td>
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<tr>
<td>Ethnic Group (Optional)</td>
<td>American Indian</td>
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</tbody>
</table>

**Signature of Student**

**Date**

**Three Methods to Register:**

- Mail Completed Form to:

- FAX Completed Form to: Would you like information on other seminars we will be offering?

- Telephone

**For Office Use Only**

| Receipt # | Check # | Amount $ | Confirmation # |

Figure R-15
SEMINAR ROSTER

SEMINAR TITLE: ____________________________ SEMINAR NO.: __________________

BEGIN DATE: ______________  END DATE: ______________ INSTRUCTOR: ______________

DAY: ______________  TIME: ______________  TOTAL HOURS: ______________

BLDG/ROOM: ____________________________ COST: __________________

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<th>MINIMUM:</th>
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<td>NAME</td>
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Figure R-16
## CLASS ATTENDANCE RECORD

**CLASS:**

**DATE(S):**

**INSTRUCTOR:**

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Figure R-17
# SEMINAR & WORKSHOP EVALUATION

Date: __________________

**Name of Seminar:** __________________

**Name of Instructor:** __________________

The purpose of this evaluation is to give the instructor the benefit of the opinions that you have formed during your participation in this seminar. You can help maintain a high quality of instruction by completing this evaluation. Please indicate your best judgement for each item by circling the number.

<table>
<thead>
<tr>
<th></th>
<th>HIGH</th>
<th>LOW</th>
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</thead>
<tbody>
<tr>
<td>1. Preparation and organization</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2. Knowledge and skills of subject</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>3. Instruction and communications</td>
<td>5</td>
<td>4</td>
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<tr>
<td>4. Control and direction of class</td>
<td>5</td>
<td>4</td>
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<tr>
<td>5. Instructor’s willingness to help</td>
<td>5</td>
<td>4</td>
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<tr>
<td>6. Suitability of training materials</td>
<td>5</td>
<td>4</td>
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<td>7. Equipment condition</td>
<td>5</td>
<td>4</td>
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<td>8. Classroom/lab condition</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>9. Attainment of specified objectives</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>10. Overall opinion of the seminar</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

**COMMENTS:** (Likes, dislikes, changes, or other suggestions)

( use back for additional comments)

**How did you hear about this seminar?**

- [ ] Brochure
- [ ] Seminar catalog
- [ ] Employer
- [ ] TV
- [ ] Radio
- [ ] Relative
- [ ] Newspaper (please specify)
- [ ] Other (please specify)

Thank you for completing this evaluation.

Figure R-18a
COURSE EVALUATION

Name of Seminar: ____________________________
Name of Instructor: ____________________________

Date: ____________________________

To the Participant: You can help the instructor improve this course by completing this evaluation. Please consider the following items and circle the number provided for varying responses. If you have suggestions or comments, write them in the spaces provided. Do Not Sign Your Name.

4 = Very Good  3 = Good  2 = Adequate  1 = Needs Improvement

INSTRUCTOR SKILLS
1. The preparation and organization of the instructor's lesson was ____________________________
2. The instructor's mastery of the subject was ____________________________
3. The instructor's enthusiasm about the subject was ____________________________
4. The clarity of the instructor's speech was ____________________________
5. The instructor's communication of the subject matter was ____________________________
6. The instructor's ability to arouse interest and enthusiasm of the participants was ____________________________
7. The instructor's clear explanation of course material was ____________________________
8. The instructor's manners; such as being easy to approach, courteous and welcoming difference of opinion were ____________________________
9. The instructor's ability to control the direction of the class was ____________________________
10. The monitoring of the student/s performance and necessary guidance by the instructor was ____________________________
11. The encouragement of student participation by the instructor was ____________________________
12. The time allowed for questions by the instructor was ____________________________
13. In general, the instructor's instructional skills were ____________________________

Comments: ____________________________

COURSE CONTENT
14. The explanation of the course objective was ____________________________
15. The amount of material covered was ____________________________
16. The audio-visual aids were ____________________________
17. The relationship between lectures and labs was ____________________________
18. The direction for lab assignments were ____________________________
19. The relationship of the course content to my particular needs was ____________________________

Comments: ____________________________

(on to the next page)
TRAINING FACILITIES
20. The availability of all necessary supplies, equipment and resources were 4 3 2 1
21. The classroom facilities were 4 3 2 1
22. The lab facilities were 4 3 2 1

Comments: __________________________________________________________

GENERAL
23. The challenge and motivation of the course was 4 3 2 1
24. The appearance and habits of the instructor were 4 3 2 1
25. As a result of this course, the improvement of my technical skills were 4 3 2 1
26. As a result of this course, the improvement of my knowledge was 4 3 2 1
27. I would enjoy taking another course from this instructor 4 3 2 1

Comments: __________________________________________________________

LIST ANY CHANGES OR RECOMMENDATIONS FOR IMPROVEMENT:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Other Comments: _______________________________________________________
________________________________________________________________________

Thank you for your comments!
We hope you have found this workshop useful. In order to help us make proper adjustments for the future, we would appreciate your candid evaluation of this program. Please leave this form on the registration desk as you depart.

1. Please print your name and address for mailing. (OPTIONAL)
   - Name
   - Title
   - Organization
   - Business Address
   - City
   - State
   - Zip

2. Title of course attended
   - Location
   - Instructor

3. What is your overall evaluation of the program?
   - _____ Excellent
   - _____ Satisfactory
   - _____ Very Good
   - _____ Unsatisfactory

4. What is the applicability or value of the subject to you?

5. What is your evaluation of the level of presentation given by the instructor?
   - _____ Excellent
   - _____ Satisfactory
   - _____ Very Good
   - _____ Unsatisfactory

6. What did you like most about this program?

7. What would you like added to the program?

(on to the next page)

Figure R-18c
8. May we use your name and comments in future notices about this program?
   _____ Yes   _____ No

9. Would you recommend this workshop to someone in your same position?
   _____ Yes   _____ Probably   _____ Possibly   _____ No

10. Please list the names and titles of others in your organization who should receive advance
    notices of similar workshops.

11. Any additional comments?

12. Please help us plan future seminars by answering the following questions:
    A. May we refer future participants to you for comments? _____ Yes   _____ No
    B. Who is your approving manager for training?
       Name__________________________ Phone (______)________
       Address________________________ FAX (______)________
       City ___________________________ State_______ Zip_____
    C. An on-site presentation of this seminar might be useful to your organization.
       Whom should we contact?
       Name__________________________ Phone (______)________
       Address________________________ FAX (______)________
       City ___________________________ State_______ Zip_____

13. What hotel did you stay at during your training period?
    Name:______________________________
    City:______________________________

14. How many nights did you stay? __________

(on to the next page) 260
15. How were the sleeping/room accommodations?
   1 2 3 4 5 6 7 8 9 10
   Poor......................................................................Excellent

16. How was the service of the hotel personnel?
   1 2 3 4 5 6 7 8 9 10
   Poor......................................................................Excellent

17. How would you rate the food and refreshments provided?
   1 2 3 4 5 6 7 8 9 10
   Poor......................................................................Excellent

18. What did you like best about this hotel?

____________________________________________________________________

19. Where might this hotel improve its services?

____________________________________________________________________

20. What airport did you fly into?

____________________________________________________________________

21. Did you drive to our city in a rental vehicle? _____ Yes _____ No

22. Did you rent a vehicle in our city? _____ Yes _____ No

23. Did you bring your own transportation? _____ Yes _____ No

24. What museums did you visit in our city?

____________________________________________________________________

25. What were some of your favorite restaurants?

____________________________________________________________________

Thank you for your comments!
To the Employer

This institution requires that all students share in the responsibility for their own vocational development. Our objective is to help learners assume responsibility while acquiring the skills needed to enter productive wage-earning employment. Instruction is competency-based, and students are evaluated on how well they can perform specific skills.

The competencies and specific skills were prepared by a group of people from the occupational field. A "5" rating reflects the degree of competence normally associated with a skilled person with two or more years of experience. The student completing a program of instruction is expected to have the majority of ratings at the "4" and "3" levels. Skills without ratings indicate that the student chose not to study the skill or that the occupational area of specialization did not require that skill. Only skills mastered by the student will be rated by the instructor.

Employers are asked to review these skill ratings periodically so that both the employer and the employee will have an ongoing awareness of the employee's development needs.

Employers may find the Record of Achievement useful in planning for promotions, assignments, and additional training.

Instructors are requested to authenticate the degree of mastery achieved by the student by checking the appropriate box every time the student masters a competency. Later, if a student achieves a higher degree of mastery there may be a second, and possibly a third, authentication by the instructor.

Instructors are also requested to indicate below their full name and school address.

Instructor

Date

Certificate of Competency

This is to certify that

has satisfactorily completed the required competencies acknowledged on the reverse side for the program of

CONVENTIONAL MACHINING

and is hereby granted this certificate

This ______ day of ___________ 19_____

Director

Instructor
## CONVENTIONAL MACHINING

### Overall Evaluation

<table>
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<tr>
<th>Level Achieved</th>
<th>Performance Levels</th>
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<tr>
<th>Overall Evaluation</th>
<th>Level Achieved</th>
<th>Performance Levels</th>
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<tr>
<td>5. Can perform this skill without supervision and with initiative and adaptability to problem situations.</td>
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<td>4. Can perform this skill satisfactorily without assistance or supervision.</td>
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<td>3. Can perform this skill satisfactorily but requires some assistance and/or supervision.</td>
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<td>2. Can perform parts of the skill satisfactorily, but requires considerable assistance and/or supervision.</td>
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<tr>
<td>1. Cannot perform this skill</td>
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Instructor will initial level achieved

Ratings on the chart are based on industrial performance standards. They are confirmed by an instructor (a skilled and experienced person from the occupation) who observes and evaluates performance as he would in the role of an employer or supervisor.

A letter of reference attested to by the individual’s attendance, punctuality, and work habits, is available from the Guidance office.

January 1985

---

**BEST COPY AVAILABLE**
# NON-TERM LENGTH CLASS REPORT

**Course Title:**

**Course No.:**

**Sec.:**

**Total Hours:**

**Theory:**

**Lab:**

**CEUs:**

**Quarter/Year:**

**Weeks:**

**Class Count:**

**Beginning Date:**

**Ending Date:**

**Division:**

**Approved:**

**Unapproved:**

**Company Name:**

**Class Location:**

**Instructor:**

**Computer ID Number:**

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**CERTIFICATES**

**LOG**

**COMPUTER INFO.**

**CATALOG**

**COURSE/SECTION**

**ID#**

**REGISTERED**

**GRADES**

Figure R-20
## INSTRUCTOR’S TEACHING LOG

Instructor Name: __________________________
Month: ___________ Year: ___________ Seminar Number: _______________________
Seminar Name: ____________________________

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Total Hrs. __________ Signature: ____________________________

Figure R-21 267
PAYROLL TIME SHEET

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</table>

Payment of ___________________________ will be made to the individual above on ______________________ (Date).

Payment will be made to individual above.

__________________________
Director

---

Figure R-22
Appendix C.....of the MAST Remote Site/Industrial Training Model contains examples of the Training Modules which could be developed for use in industrial training. These modules would serve as a “starting place” for developing and conducting the seminars and workshops.
Machine Tool Advanced Skills Technology Program

MAST

REMOTE SITE/INDUSTRIAL TRAINING

MACHINIST SERIES

TECHNICAL MODULE NO. MAC-E5

DUTY - PERFORM MEASUREMENT/INSPECTION

TASK - Perform Measurements With Hand Held Instruments

Average Module Completion Time - 4 Hours
Machine Tool Advanced Skills Technology (MAST) Program

MAST is a consortia of six leading technical and community colleges with training expertise in precision manufacturing technologies. These colleges are:

- Augusta Technical Institute, Augusta, GA
- San Diego City College (CACT), San Diego, CA
- Itawamba Community College, Tupelo, MS
- Moraine Valley Community College, Palos Hills, IL
- Springfield Technical College, Springfield, MA
- Texas State Technical College, Waco, Texas

This series of technical modules was produced by the MAST Program and was based upon a grant funded by the U.S. Department of Education. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the MAST Program and do not necessarily reflect the views of the Department of Education.

This training program is one of a series of fifteen (15) which have been designed, developed, and disseminated by the MAST consortia partners. The fifteen technical specialty areas which were investigated by MAST include the following:

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<td>CIM</td>
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</table>

MAST worked jointly with industry to create these new training programs which have addressed the rapidly changing needs of the technology driven machine tool and metals related manufacturing industry. These training materials were developed after many hours of in-depth interviews with industry regarding to the “Duties” and “Tasks” which were most often performed by their workers. As a result of these interviews, a Competency Profile was developed for each participating company. These individual company Competency Profiles were then analyzed, and from them a “composite” Competency Profile was produced. After further validation, from a national survey, this “industry driven” Competency Profile was used as the basis for the development of a comprehensive series of instructional materials.

The Competency Profile for this occupational specialty is located at the end of this module. The highlighted DUTY/TASK is covered in this technical module.

This material is also available on the internet located at: http://machinetool.tstc.edu
MACHINIST SERIES
MASTER TECHNICAL MODULE NO. MAC-E5
Recommended Usage Key: /Remote/Secondary/College

SUBJECT: CONVENTIONAL MACHINING TIME: 4 Hours

DUTY: PERFORM MEASUREMENT/INSPECTION

TASK: Perform Measurements with Hand Held Instruments

OBJECTIVE(S): Upon completion of this unit the student will be able to:

a. Measure with steel rules (metric and English)
b. Measure with micrometers
c. Measure with comparison measuring instruments (e.g., calipers, telescope gages)
d. Measure with direct measuring instruments (e.g., vernier, dial and digital instruments)
e. Measure with fixed gages (go and no go gages)

INSTRUCTIONAL MATERIALS:

- Steel rules (metric and fractional) for each student or group of students
- 0-1" micrometers for each student or group of students
- Assortment of outside (larger than 1") micrometers
- 1 set inside micrometers
- 1 set depth micrometer
- 1 ea. - outside spring caliper and inside spring caliper
- 6" dial calipers for each student or group of students
- Random collection of objects for student practice.
- MAST Laboratory Aid (MAC-E5-LA)
  - 1 ea. - Digital micrometer and digital vernier caliper
  - 1 ea. - Set of telescoping gages and set of small hole gages
  - Examples of “go-no go” gages
  - Video “Precision Measurement in the Machine Shop”
- MAST Video Tape (MAC-E5-VT)
- Handout “Proper Measuring Technique”
- MAST Handout (MAC-E5-HO)

REFERENCES:

The following NTMA Machinist Training Modules are recommended as reference material.

MA-I-05 “Steel Rules”
MA-I-09 “Steel Rules and Transfer Tools”
MA-I-13 “Micrometers”
MA-I-17 “Vernier Instruments”
STUDENT PREPARATION:

Students should have previously completed the following MAST Technical Modules:
MAC-E1 “Identify Types of Measurements”
MAC-E2 “Select proper measurement tools”
MAC-E3 “Apply proper measuring techniques”
MAC-E4 “Use Metric and English Standards of Measurement”

INTRODUCTION:

Every aspect of our lives, from the clothes we wear to the car we drive, is greatly influenced by measurement. For the machinist, measurement is especially important since it is the machinist who is responsible for crafting the tools, fixtures and components which make up or support virtually every part of our lives. Therefore, it is essential for the machinist to be a master in the use of not only the machine tools but also the instruments which are used to measure the precision components demanded by consumers today. One of the most valuable assets you can possess is the expert use of the machinist measuring tools and a desire to practice quality consciousness in every aspect of your job performance.

PRESENTATION OUTLINE:

I. Discuss the importance of learning and practicing proper measurement techniques.
   A. Show the video “Precision Measurement in the Machine Shop”
   B. Give each student a copy of the handout “Proper Measuring Techniques”
   C. Practice and demonstration of skills listed above

II. Discuss and demonstrate proper measurement techniques using the steel rule.

III. Discuss and demonstrate the use of micrometer type measuring instruments.
   A. Outside micrometers
   B. Inside micrometers
   C. Depth micrometers
   D. Practice and demonstration of skills listed above

IV. Discuss and demonstrate the use transfer type measuring instruments.
   A. Spring calipers (inside and outside)
   B. Telescope gages
   C. Small hole gages
   D. Practice and demonstration of skills listed above

V. Discuss and demonstrate the use of direct measuring instruments.
   A. Vernier calipers
   B. Dial calipers
   C. Digital calipers
   D. Practice and demonstration of skills listed above

VI. Discuss the purpose of fixed gages and demonstrate their use.
   A. Cylindrical plug and ring gages
   B. Taper plug and ring gages
   C. Snap gages
   D. Thread plug gages
   E. Practice and demonstration of skills listed above

VII. Practical Exercise
PRACTICAL APPLICATION:

Students will practice in the lab with each measuring instrument. Each student will then complete the Laboratory Worksheet MASTER Laboratory Worksheet (MAC-E5-LW) and turn in to the instructor for checking.

EVALUATION AND/OR VERIFICATION:

Successful completion of this Technical Module will be based on the student’s successful completion of the following three components:

1. Measure with the steel rule to an accuracy of +/- 1/32”.
2. Measure with the micrometer to an accuracy of +/- 001”.
3. Measure with the dial caliper to an accuracy of +/- .001”

SUMMARY:

Review the main lesson points using the handout “Proper Measuring Techniques”. Hold class discussion and answer student questions.

NEXT LESSON ASSIGNMENT:

MAST Technical Module (MAC-E6) dealing with measurement and inspection using a surface plate and accessories.
TECHNICAL MODULE MATERIALS TO BE INCLUDED...

- **MAST Laboratory Aid (MAC-E5-LA)**
  
  *This will be a drawing/explanation of a set of standards which can be produced in somebody’s machine shop. These standards can be used for student practice when measuring lengths, outside diameters, inside diameters, etc.*

- **MAST Video Tape (MAC-E5-VT) “Precision Measurement in the Machine Shop”**
  
  *This will be a short description of the video tape with information regarding it’s source, cost and playing time.*

- **MAST Handout (MAC-E5-HO) “Proper Measuring Techniques”**
  
  *This will be a student handout which will provide illustrations and useful information not found in the text.*

- **MAST Laboratory Worksheet (MAC-E5-LW)**
  
  *This will be a student laboratory sheet which will guide the students through a series of structured exercises in which they will learn and improve their measuring skills using the instruments which were covered in this module.*
MACHINIST... plan, layout, set up, and operate hand and machine tools to perform machining operations necessary to produce a workpiece to referenced engineering standards.

### Duties

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### Tasks

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**BEST COPY AVAILABLE**

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For more information:

MAST Program Director
Texas State Technical College
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Waco, TX 76705

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http://machinetool.tstc.edu
MACHINE TOOL ADVANCED SKILLS

TECHNOLOGY PROGRAM

MAST

REMOTE SITE/INDUSTRIAL TRAINING

INDUSTRIAL MAINTENANCE MECHANICS SERIES

AUGUSTA TECHNICAL INSTITUTE

TECHNICAL MODULE NO. IMM-F5

DUTY - OPERATE MACHINE TOOLS

TASK - Operate Lathe

Average Module Completion time - 68 Hours

AMTEC®
MAST is a consortium of six leading technical and community colleges with training expertise in manufacturing technologies. These colleges are:

- Augusta Technical Institute (AMTEC), Augusta, GA
- San Diego City College (CACT), San Diego, CA
- Itawamba Community College, Tupelo, MS
- Moraine Valley Community College, Palos Hills, IL
- Springfield Technical College, Springfield, MA
- Texas State Technical College, Waco, Texas

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**OCCUPATIONAL SPECIALTIES**
- Manufacturing Engineering Technology (MET)
- Machining (MAC)
- Electrical Discharge Machining (EDM)
- Superabrasive Grinding (SAG)
- Mold Making (MLD)
- Welding (WLD)
- Industrial Maintenance Mechanics (IMM)
- Sheet Metal (SML)
- Composites (COM)
- Tool and Die (TLD)
- Computer-Aided Design And Drafting (CAD)
- CNC/CAM (CNC)
- Instrumentation (INT)
- Laser Machining (LSR)
- Automated Equipment Technician/CIM (CIM)

MAST worked jointly with industry to create these new training programs which have addressed the rapidly changing needs of the technology driven manufacturing industry. These training materials were developed after many hours of in-depth interviews with industry regarding to the "Duties" and "Tasks" which were most often performed by their workers. As a result of these interviews, a Competency Profile was developed for each participating company. These individual company Competency profiles were then analyzed, and from them a "composite" Competency Profile was produced. After further validation, from a national survey, this "industry driven" Competency Profile was used as the basis for the development of a comprehensive series of instructional materials.

The Competency Profile for this occupational specialty is located at the end of the module. The highlighted DUTY/TASK is covered in the technical module.

This material is also available on the internet located at: http://machinetool.tstc.edu
SUBJECT: CONVENTIONAL MACHINING  TIME: 68 Hours

• DUTY: OPERATE MACHINE TOOLS
• TASK: Operate Lathe

OBJECTIVE(S): Upon completion of this unit the student will be able to:

a. Identify major component parts of an engine lathe.
b. Properly set up and use lathe accessories required for basic lathe operation.
c. Determine correct speed and feed for a given metal.
d. Identify safety concerns relative to lathe operation.
e. Demonstrate set up and use of lathe operation.
f. Identify and use different types of lathe cutting tools.
g. Face cut and turn stock between centers to a specified tolerance.
h. Demonstrate method of drilling, boring and reaming a hole to obtain specified tolerance.

INSTRUCTIONAL MATERIALS:

• Tool grinder
• Instructional material
• Hand tools
• Assortment of outside micrometers up to 3"
• Lab standards, MAST Laboratory Aid (IMM-F5-LA)
• Depth gage
• Telescoping gage
• Dial calipers
• Tool stock
• Handout reading assignments in textbook, objectives, and outlines Mast Handout (IMM-F5-HO)
• Side shield and face shield
• 2" Stock for practice and evaluation
• Engine lathe
• Technology of Machine Tools textbook, chapter 45-52, and 53
• MAST Video Tape (IMM-F5-VT1)
• MAST Laboratory worksheets (IMM-F5-LW1 and IMM-F5-LW2)
REFERENCES:


The following video tapes available from Bergwall Productions in series 501(LATHE):

1. Basic Parts #501.01X-1 VHS
2. Setting Up Work #501.02X-2 VHS
3. Accessories #501.03X-1 VHS
4. Work Operations On 3 And 4 Jaw Chucks #501.04X-1 VHS
5. Three Ways To Taper #501.04X-1 VHS
6. Cutting A Thread #501.06X-1 VHS

STUDENT PREPARATION:

Students should have previously completed the following MAST Technical Modules:

   IMM-A “Practice Safety”
   IMM-B “Apply Mathematical Concepts”
   IMM-C “Interpret Engineering Drawings and Control Documents”
   IMM-D “Use Measuring Tools”
   IMM-E “Use Hand Tools”
   IMM-F “Grinders”

INTRODUCTION:

The lathe is a powered machine capable of producing many cylindrical devices used in many everyday and industrial applications. Usually the raw product is a piece of rolled solid stock. A maintenance mechanic may need to fabricate a part from a raw product or repair an existing part. The lathe is one of the most common powered tools found in a machine shop or maintenance shop in an industrial plant. If a part is cylindrical, the lathe was probably used to produced the part. Using the lathe to some degree of expertise is important to a maintenance mechanic.
PRESENTATION OUTLINE:

I. Discuss the importance of the lathe to the maintenance mechanic
   A. Give each student a copy of the following attachments:
      1. Laboratory aid and required video tapes
      2. Objectives, reading assignments, and module outline
      3. Laboratory worksheet 1 and 2
      4. Project 2 drawing and duties/tasks profile

II. Identify and discuss component parts of an engine lathe
    A. Control Panel
    B. Bed & ways
    C. Head stock
    D. Gear box
    E. Carriage
    F. Tailstock

III. Identify, setup and demonstrate use of lathe accessories
     A. Centers
     B. Chucks
     C. Faceplates
     D. Mandrels
     E. Steady and follower rest
     F. Lathe dogs
     G. Driver plates
     H. Tool holders
     I. Boring bars

IV. Discuss and demonstrate how to select the correct speed and feed for various metals
    A. Steel
    B. Aluminum
    C. Brass

V. Discuss lathe safety
   A. Clamping of work
   B. Watches & rings
   C. Housekeeping
   D. Chuck wrenches
   E. Removing chips
   F. Measurements

VI. Discuss and demonstrate use of lathe centers.
    A. Mounting
    B. Removing
C. Aligning

VII. Discuss and demonstrate use of cutting tools.
A. Grinding a toolbit
B. Conditioning point of bits
C. Types of cutting tools

VIII. Discuss and demonstrate turning between centers
A. Why face cut
B. Center drill
C. Using a tailstock center
D. Using steady rest
E. Using chucks

IX. Discuss and demonstrate method of drilling, boring and reaming using a lathe

PRACTICAL APPLICATION:

Students will practice in the lab using the lathe. Each student will complete the laboratory exercise prior to proceeding to the performance evaluation.

EVALUATION AND/OR VERIFICATION:

Successful completion of this Technical Module will be based on the student’s successful completion of the following components.

1. The student will complete a written evaluation of knowledge items.
2. The student will demonstrate safe operation of the lathe.
3. The student shall fabricate a component to specified tolerance when given a drawing, tools, and equipment. (Refer to figure 1).

SUMMARY:

Review the main lesson points using the objective as a guide. Hold class discussion and answer student questions.

NEXT LESSON ASSIGNMENT:

MAST Technical Module (IMM-F6) dealing with measurement and inspection using a surface plate and accessories.
ATTACHMENT 1. Mast Laboratory Aid (IMM-F5-LA)

Standards of performance safety: Student shall:
1. Use OSHA required safety equipment for the shop:
   safety glasses - hearing protection
   face shields - gloves
2. Do not wear rings, watches, loose jewelry, or loose clothing while operating equipment.

Conduct:
1. There will be no horse play or practical joking.
2. If in doubt, as to safe operation of the equipment, STOP and seek guidance from the instructor.
MAST Video Tape (IMM-F5-VT1) - Feeds and Speeds

(Available by contacting MAST Program at 817/867-4849.)
ATTACHMENT 2  MAST Handout (IMM-F5-HO)

OBJECTIVE(S):  Upon completion of this unit the student will be able to:

1. Identify major component parts of an engine lathe.
2. Properly set up and use lathe accessories required for basic lathe operation.
3. Determine correct speed and feed for a given metal.
4. Identify safety concerns relative to lathe operation.
5. Demonstrate set up and use of lathe operation.
6. Identify and use different types of lathe cutting tools.
7. Face cut and turn stock between centers to a specified tolerance.
8. Demonstrate method of drilling, boring and reaming a hole to obtain specified tolerance.

READING ASSIGNMENTS:

The following chapters are assigned to read from Technology of Machine Tools textbook, edition 4.

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<td>349 to 352</td>
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MODULE OUTLINE:

I. Discuss the importance of the lathe to the maintenance mechanic
   A. Give each student a copy of the following attachments:
      1. Laboratory aid and required video tapes
      2. Objectives, reading assignments, and module outline
      3. Laboratory worksheet 1
      4. Laboratory worksheet 2 and attached drawing

II. Identify and discuss component parts of an engine lathe
   A. Control Panel
   B. Bed & ways
III. Identify, set up and demonstrate use of lathe accessories
A. Centers
B. Chucks
C. Faceplates
D. Mandrels
E. Steady and follower rest
F. Lathe dogs
G. Driver plates
H. Tool holders
I. Boring bars

IV. Discuss and demonstrate how to select the correct speed and feed for various metals
A. Steel
B. Aluminum
C. Brass

V. Discuss lathe safety
A. Clamping of work
B. Watches & rings
C. Housekeeping
D. Chuck wrenches
E. Removing chips
F. Measurements

VI. Discuss and demonstrate use of lathe centers
A. Mounting
B. Removing
C. Aligning

VII. Discuss and demonstrate use of cutting tools
A. Grinding toolbit
B. Conditioning point of bits
C. Types of cutting tools

VIII. Discuss and demonstrate turning between centers
A. Why face cut
B. Center drill
C. Using a tailstock center
D. Using steady rest
E. Using chucks
IX. Discuss and demonstrate method of drilling, boring and reaming using a lathe
ATTACHMENT 3 MAST Laboratory Worksheet (IMM-F5-LW1)

WORK SHEET 1:

1. Established standards for safety and conduct shall be followed

2. Equipment required:
   Tool grinder
   Hand tools as required to operate lathe
   Set of inside and outside micrometers up to 3"
   Telescoping gages
   Dial calipers
   Toolstock
   Face shield
   Side shields
   3-6" sections of bar stock for practice
   Drill and sleeve appropriate to hole required
   Reamer appropriate for hole required
   Lathe with accessories suitable for project

3. Exercises must be taken in sequence. Instructor must confirm proficiency prior to student progressing to next exercise

4. Practice exercises tool grinding:
   A. Grind lathe cutting tool appropriate to metal being turned
      (1) Instructor must see lathe tool prior to proceeding

5. Practice exercise lathe familiarization
   A. Student shall practice using lathe controls until familiar
      (1) Selecting speeds & feeds (use of S & L chart)
      (2) Start and stopping of machine and emergency stop
      (3) Engage and disengage feed controls
      (4) Positioning tool in tool holder
   B. Student shall practice using accessories
      (1) Centering stock in available chucks
      (2) Setting up stock between centers
      (3) Running machine with stock mounted in the chuck
   C. Lathe operation
      (1) Practice taking cuts using manual feed
      (2) Practice taking cuts using the engine driven feed and speed controls
      (3) Practice center drilling
      (4) Practice drilling with the drill bit mounted in the tail stock
      (5) Practice reaming
      (6) Practice cutting a taper using the compound rest (manual feed)
   D. Fabricate a part to tolerances specified on the drawing provided
WORKSHEET 2:

1. This exercise will combine the skills and knowledge practices in previous lab exercises to fabricate the component described by attachment 5.

2. Preestablished safety concerns by the drawing.

3. Maintain tolerances by the drawing.

The project will require the student to demonstrate skills and knowledge in the following:

- Practice safety
- Basic math
- Blueprint reading
- Measuring instruments
- Pedestal grinder operation
- Lathe operation
ATTACHMENT 5

Attachment 5 consists of a drawing of project 2
NOTE
ALL DIA. + OR - .003"
ALL LENGTH + OR - .015"
ALL DIM. IN INCHES

.750 DIA.
REAM .500 X 1.5 DEEP
60 DEGREE INCLUDED

1.000
1.500
0.500

2.000
1.500
0.500

0.750

AUGUSTA TECH
3116 DEANS BRIDGE RD.
AUGUSTA GA. 30906 USA

PROJECT 2
MATERIAL
ALUM. 6061-T3

DATE
2-28-96

SCALE
1-1

DRAWN BY
AUGUSTA TECH

REV.

APPROVED

TITLE

SWG

MATERIAL

REV.

PROJECT 2
ALUM. 6061-T3
ATTACHMENT 6

Attachment 6 consists of the industrial maintenance mechanic duties and tasks.
**INDUSTRIAL MAINTENANCE MECHANIC**...uses mechanical, pneumatic, hydraulic, and electrical skills to maintain, repair and/or install equipment/machinery used in industry.

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<td>B</td>
<td>Apply Mathematical Concepts</td>
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<tr>
<td>C</td>
<td>Interpret Engineering Drawings and Control Documents</td>
</tr>
<tr>
<td>D</td>
<td>Use Measuring Tools</td>
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<td>I</td>
<td>Repair Power Transmission Systems</td>
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<td>J</td>
<td>Fabricate/Install Sheet Metal Parts</td>
</tr>
</tbody>
</table>
For more information:

MAST SITE COORDINATOR
RONNIE LAMBERT
Augusta Technical College
3115 Deans Bridge Road
Augusta, GA 30906

(706) 796-2360
FAX (706) 771-4091
TECHNICAL MODULE NO. TLD-D3

DUTY - DEMONSTRATE KNOWLEDGE OF MANUFACTURING MATERIALS

TASK - Discuss Classification System for Metals

Average Module Completion time - 8 Hours
TOOL & DIE SERIES
MAST TECHNICAL MODULE NO. TLD-D3
Recommended Usage Key: /Remote/Secondary/College

SUBJECT: TOOL AND DIE MAKER
TIME: 8 Hours

- DUTY: DEMONSTRATE KNOWLEDGE OF MANUFACTURING MATERIALS
- TASK: Discuss Classification System for Metals

OBJECTIVES: Upon completion of this unit the student will be able to:

a. Identify organizations that classify metals
b. Distinguish between types of metal by manufacturing method and/or shape
c. Identify designation of each digit of a metal classification
d. Identify carbon and alloy content of a metal using classification system
e. Identify content of an unknown metal using shop tests.
f. Identify conformity of a metal to a specification system.

INSTRUCTIONAL MATERIALS:

- Random collection of objects for student practice (shop tests) and observation
- MAST Laboratory Aid (TLD-D3-LA1)
- Handout "AISI-SAE Standard Steels Classification"
- MAST Handout (TLD-D3-HO1)
- Handout "AISI Tool Steels Classification" & "UNS for Metals and Alloys"
- MAST Handout (TLD-D3-HO2)
- Handout "Example of a Specification"
- MAST Handout (TLD-D3-HO3)
- Worksheet for student practice and grade
- MAST Worksheet (TLD-D3-LW1)
- Exam
- MAST EXAM (TLD-D3-EX1)

REFERENCES:

The following NTMA Machinist Training Modules are recommended as reference material:

MA-II-57 "Metallurgy: Steel Classifications & Basic Tests for Identifying the Content of an Unknown Metal"
MA-II-59 "Metallurgy: Plain Carbon Steel"
MA-II-67 "Metallurgy: Alloy Steels and Stainless Steels"
MA-II-69 "Metallurgy: Aluminum and Aluminum Alloys"
MA-II-71 "Metallurgy: Magnesium and Magnesium Alloys"
INTRODUCTION:

When there was only wrought iron and plain carbon steel available, separating and identifying metals was relatively simple. Now, however, with the hundreds of different compositions in use, identification would be confusing without some means of reference or classification. Several different numbering systems have been developed by various organizations to classify metals and alloys according to content, properties, manufacturing process, or intended use. A Tool and Die Maker must be capable of distinguishing between materials by understanding these systems and their designations.

PRESENTATION OUTLINE:

I. Identify the organizations that classify metals and discuss the significance of each
   A. American Iron and Steel Institute (AISI)
   B. Society of Automotive Engineers (SAE)
   C. American Society for Testing and Materials (ASTM)
   D. American National Standards Institute (ANSI)
   E. Aluminum Association

II. Identify classifications by manufacturing methods or processes
   A. Hot Rolled
   B. Cold Rolled
   C. Turned & Polished (sometimes referred to as ground and polished)
   D. Castings
   E. Forgings
   F. Galvanized

III. Identify classifications by shape
   A. Sheet and Plate
   B. Bar Stock
   C. Pipe and Tubing
   D. Rod and Wire
   E. Coil or Strip
F. Structural Steel

IV. Discuss the AISI-SAE numbering systems for carbon steels
A. Plain Carbon Steels (AISI-SAE 10xx and 15xx)
B. Free-Cutting Steels (AISI-SAE 11xx and 12xx)

V. Discuss the AISI-SAE classification systems for alloy steels
A. Manganese Steels (AISI-SAE 13xx)
B. Nickel Steels (AISI-SAE 2xxx)
C. Nickel-Chromium Steels (AISI-SAE 3xxx)
D. Molybdenum Steels (AISI-SAE 4xxx)
E. Low Chromium Steels (AISI-SAE 5xxx)
F. Other Alloy Steels (AISI-SAE 61xx, 8xxx, and 9xxx)

VI. Discuss the AISI-SAE classification of stainless steels
A. Chromium-Nickel Austenitic Steels (SAE 30xx or AISI 20x and 3xx)
B. Ferritic Chromium Steels (SAE 51xxx or AISI 4xx and 50x)
C. Martensitic Chromium Steels (SAE 51xxx or AISI 4xx and 50x)

VII. Discuss the AISI classification of tool steels
A. High Speed Tool Steels (AISI Type M and T)
B. Hot Work Tool Steels (AISI Type H)
C. Cold Work Tool Steels (AISI Type D, A, and O)
D. Shock Resisting Tool Steels (AISI Type S)
E. Mold Steels (AISI Type P)
F. Special Purpose Tool Steels (AISI Type L and F)
G. Water Hardening Tool Steels (AISI Type W)

VIII. Discuss the classification of nonferrous alloys
A. Aluminum and Aluminum Alloys (Aluminum Association Four Digit System)
B. Magnesium Alloys (SAE Type 5x and 5xx)
C. Nickel and Nickel Alloys (By Name)
D. Titanium and Titanium Alloys (Titanium and Chief Alloying Element)
E. Copper and Copper Alloys (By Name and SAE Standard No.)

IX. Discuss the classification of castings
A. Brass and Bronze Castings (SAE Standard No.)
B. Aluminum Casting Alloys (Aluminum Association Four Digit System)
C. Cast Iron (ASTM Grade)
D. Steel Castings (ASTM Grade)

X. Discuss the Unified Numbering System (UNS) for metals and alloys

XI. Discuss the basic identification of an unmarked piece of steel using shop tests
A. Observation
B. Magnet Test
C. Hardness Test
D. Scratch Test
E. File Test
F. Chemical Test
G. Spark Test

XII. Identify specification systems for metals and alloys
   A. American Society for Testing and Materials (ASTM)
   B. American National Standards Institute (ANSI)
   C. U.S. Department of Defense (Military Specifications)
   D. General Accounting Office (Federal Specifications)

PRACTICAL APPLICATION:

Students will practice identifying materials by their nomenclature and by shop tests. Each student will then complete the Laboratory Worksheet MAST Laboratory Worksheet (TLD-D3-LW1) and turn it into the instructor for checking.

EVALUATION AND/OR VERIFICATION:

Successful completion of this Technical Module will be based on the student’s successful completion of the following components:

1. Identify organizations that classify metals.
2. Identify metal type given a classification.
3. Identify content of a metal given a classification.
4. Identify content of an unknown metal using shop tests.
5. Identify conformity of a metal given an ASTM specification.

SUMMARY:

Review the main lesson points and topics during review for exam. Hold class discussion and answer student questions.

NEXT LESSON ASSIGNMENT:

MAST Technical Module (TLD-D4) dealing with the manufacturing properties of materials.
### AISI-SAE STANDARD STEELS CLASSIFICATION

<table>
<thead>
<tr>
<th>AISI-SAE</th>
<th>Type of Steel and Nominal Alloy Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carbon Steels</strong></td>
<td></td>
</tr>
<tr>
<td>10xx</td>
<td>Plain Carbon (Max 1% Mn.)</td>
</tr>
<tr>
<td>15xx</td>
<td>Plain Carbon (Max 1%-1.65% Mn.)</td>
</tr>
<tr>
<td>11xx</td>
<td>Free Cutting, Resulfurized</td>
</tr>
<tr>
<td>12xx</td>
<td>Free Cutting, Resulfurized and Rephosphorized</td>
</tr>
<tr>
<td><strong>Manganese Steels</strong></td>
<td></td>
</tr>
<tr>
<td>13xx</td>
<td>1.75% Manganese</td>
</tr>
<tr>
<td><strong>Nickel Steels</strong></td>
<td></td>
</tr>
<tr>
<td>23xx</td>
<td>3.50% Nickel</td>
</tr>
<tr>
<td>25xx</td>
<td>5.00% Nickel</td>
</tr>
<tr>
<td><strong>Nickel-Chromium Steels</strong></td>
<td></td>
</tr>
<tr>
<td>31xx</td>
<td>1.25% Nickel; 0.65% &amp; 0.80% Chromium</td>
</tr>
<tr>
<td>32xx</td>
<td>1.75% Nickel; 1.07% Chromium</td>
</tr>
<tr>
<td>33xx</td>
<td>3.50% Nickel; 1.50% &amp; 1.57% Chromium</td>
</tr>
<tr>
<td>34xx</td>
<td>3.00% Nickel; 0.77% Chromium</td>
</tr>
<tr>
<td><strong>Molybdenum Steels</strong></td>
<td></td>
</tr>
<tr>
<td>40xx</td>
<td>0.20% and 0.25% Molybdenum</td>
</tr>
<tr>
<td>44xx</td>
<td>0.40% and 0.52% Molybdenum</td>
</tr>
<tr>
<td><strong>Chromium-Molybdenum Steels</strong></td>
<td></td>
</tr>
<tr>
<td>41xx</td>
<td>0.50% - 0.95% Chromium; 0.12% - 0.30% Molybdenum</td>
</tr>
<tr>
<td><strong>Nickel-Molybdenum Steels</strong></td>
<td></td>
</tr>
<tr>
<td>46xx</td>
<td>0.85% &amp; 1.82% Nickel; 0.20% &amp; 0.25% Molybdenum</td>
</tr>
<tr>
<td>48xx</td>
<td>3.50% Nickel; 0.25% Molybdenum</td>
</tr>
<tr>
<td><strong>Chromium Steels</strong></td>
<td></td>
</tr>
<tr>
<td>50xx</td>
<td>0.27% - 0.65% Chromium</td>
</tr>
<tr>
<td>51xx</td>
<td>0.80% - 1.05% Chromium</td>
</tr>
<tr>
<td>50xxx</td>
<td>0.50% Chromium; Min. 1.00% Carbon</td>
</tr>
<tr>
<td>51xxx</td>
<td>1.02% Chromium; Min. 1.00% Carbon</td>
</tr>
<tr>
<td>52xxx</td>
<td>1.45% Chromium; Min. 1.00% Carbon</td>
</tr>
<tr>
<td><strong>Chromium-Vanadium Steels</strong></td>
<td></td>
</tr>
<tr>
<td>61xx</td>
<td>0.60% - 0.95% Chromium; 0.10% and 0.15% Vanadium</td>
</tr>
<tr>
<td><strong>Tungsten-Chromium Steels</strong></td>
<td></td>
</tr>
<tr>
<td>72xx</td>
<td>1.75% Tungsten; 0.75% Chromium</td>
</tr>
<tr>
<td><strong>Triple Alloy Steels</strong></td>
<td></td>
</tr>
<tr>
<td>43xx</td>
<td>1.82% Nickel; 0.50% &amp; 0.80% Chromium; 0.25% Molybdenum</td>
</tr>
<tr>
<td>47xx</td>
<td>1.05% Nickel; 0.45% Chromium; 0.20% &amp; 0.35% Molybdenum</td>
</tr>
<tr>
<td>80xx</td>
<td>0.30% - 0.55% Nickel; 0.40% - 0.50% Chromium; 0.12% - 0.35% Molybdenum</td>
</tr>
<tr>
<td>92xx</td>
<td>1.40% &amp; 2.00% Silicon; 0.00% &amp; 0.65% Chromium; 0.65% - 0.85% Manganese</td>
</tr>
<tr>
<td>93xx</td>
<td>3.25% Nickel; 1.20% Chromium; 0.12% Molybdenum</td>
</tr>
<tr>
<td>94xx</td>
<td>0.45% Nickel; 0.40% Chromium; 0.12% Molybdenum</td>
</tr>
<tr>
<td>98xx</td>
<td>1.00% Nickel; 0.80% Chromium; 0.25% Molybdenum</td>
</tr>
<tr>
<td><strong>Stainless Steels</strong></td>
<td></td>
</tr>
<tr>
<td>2xx</td>
<td>302xx Austenitic Steels; 16% - 19% Chromium; 1% - 5.5% Nickel</td>
</tr>
<tr>
<td>3xx</td>
<td>303xx Austenitic Steels; 16% - 24% Chromium; 6% - 15% Nickel</td>
</tr>
<tr>
<td>4xx</td>
<td>514xx Ferritic or Martensitic Steels; 10.5% - 18% Chromium</td>
</tr>
<tr>
<td>5xx</td>
<td>515xx Ferritic or Martensitic Steels; 4% - 6% Chromium</td>
</tr>
</tbody>
</table>
# TLD-D3-H02

## AISI TOOL STEELS CLASSIFICATION

<table>
<thead>
<tr>
<th>CATEGORY DESIGNATION</th>
<th>AISI</th>
<th>GROUP DESIGNATION</th>
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<tbody>
<tr>
<td>High Speed Tool Steels</td>
<td>M</td>
<td>Molybdenum Types</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>Tungsten Types</td>
</tr>
<tr>
<td>Hot Work Tool Steels</td>
<td>H1</td>
<td>Chromium Types</td>
</tr>
<tr>
<td></td>
<td>H19</td>
<td>Chromium Types</td>
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<tr>
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<td>H20</td>
<td>Tungsten Types</td>
</tr>
<tr>
<td></td>
<td>H39</td>
<td>Tungsten Types</td>
</tr>
<tr>
<td></td>
<td>H40</td>
<td>Molybdenum Types</td>
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<tr>
<td></td>
<td>H59</td>
<td>Molybdenum Types</td>
</tr>
<tr>
<td>Cold Work Tool Steels</td>
<td>D</td>
<td>High Carbon, High Chromium Types</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>Medium Alloy, Air Hardening Types</td>
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<tr>
<td></td>
<td>O</td>
<td>Oil Hardening Types</td>
</tr>
<tr>
<td>Shock Resisting Tool Steels</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Mold Steels</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Special Purpose Tool Steels</td>
<td>L</td>
<td>Low Alloy Types</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>Carbon Tungsten Types</td>
</tr>
<tr>
<td>Water Hardening Tool Steels</td>
<td>W</td>
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</table>

## UNIFIED NUMBERING SYSTEM (UNS) FOR METALS & ALLOYS

<table>
<thead>
<tr>
<th>UNS SERIES</th>
<th>METAL</th>
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<tbody>
<tr>
<td>A00001 to A99999</td>
<td>Nonferrous Metals and Alloys</td>
</tr>
<tr>
<td>C00001 to C99999</td>
<td>Aluminum and Aluminum Alloys</td>
</tr>
<tr>
<td>E00001 to E99999</td>
<td>Copper and Copper Alloys</td>
</tr>
<tr>
<td>E00001 to E99999</td>
<td>Rare Earth and Rare Earth-Like Metals and Alloys</td>
</tr>
<tr>
<td>L00001 to L99999</td>
<td>Low Melting Metals and Alloys</td>
</tr>
<tr>
<td>M00001 to M99999</td>
<td>Miscellaneous Nonferrous Metals and Alloys</td>
</tr>
<tr>
<td>P00001 to P99999</td>
<td>Precious Metals and Alloys</td>
</tr>
<tr>
<td>R00001 to R99999</td>
<td>Reactive and Refractory Metals and Alloys</td>
</tr>
<tr>
<td>Z00001 to Z99999</td>
<td>Zinc and Zinc Alloys</td>
</tr>
<tr>
<td>D00001 to D99999</td>
<td>Specified Mechanical Property Steels</td>
</tr>
<tr>
<td>F00001 to F99999</td>
<td>Cast Irons</td>
</tr>
<tr>
<td>G00001 to G99999</td>
<td>AISI and SAE Carbon and Alloy Steels (Except Tool Steels)</td>
</tr>
<tr>
<td>H00001 to H99999</td>
<td>AISI H-Steels</td>
</tr>
<tr>
<td>J00001 to J99999</td>
<td>Cast Steels (Except Tool Steels)</td>
</tr>
<tr>
<td>K00001 to K99999</td>
<td>Miscellaneous Steels and Ferrous Alloys</td>
</tr>
<tr>
<td>S00001 to S99999</td>
<td>Heat and Corrosion Resistant (Stainless Steels)</td>
</tr>
<tr>
<td>T00001 to T99999</td>
<td>Tool Steels</td>
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# EXAMPLE OF A SPECIFICATION

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<tr>
<th>Size</th>
<th>Tolerance</th>
<th>Out-of-Section</th>
<th>Size</th>
<th>Tolerance</th>
<th>Out-of-Section</th>
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<tbody>
<tr>
<td></td>
<td>Plus</td>
<td>Minus</td>
<td>Plus</td>
<td>Minus</td>
<td>Plus</td>
</tr>
<tr>
<td>Rounds, Squares and Round-Cornered Squares</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>To 5/16</td>
<td>.005</td>
<td>.005</td>
<td>.008</td>
<td>Over 1-1/2 to 2</td>
<td>1/64</td>
</tr>
<tr>
<td>Over 5/16 to 7/16</td>
<td>.006</td>
<td>.006</td>
<td>.009</td>
<td>Over 2 to 2-1/2</td>
<td>1/32</td>
</tr>
<tr>
<td>Over 7/16 to 5/8</td>
<td>.007</td>
<td>.007</td>
<td>.010</td>
<td>Over 2-1/2 to 3-1/2</td>
<td>3/64</td>
</tr>
<tr>
<td>Over 5/8 to 7/8</td>
<td>.008</td>
<td>.008</td>
<td>.012</td>
<td>Over 3-1/2 to 4-1/2</td>
<td>1/16</td>
</tr>
<tr>
<td>Over 7/8 to 1</td>
<td>.009</td>
<td>.009</td>
<td>.013</td>
<td>Over 4-1/2 to 5-1/2</td>
<td>5/64</td>
</tr>
<tr>
<td>Over 1 to 1-1/8</td>
<td>.010</td>
<td>.010</td>
<td>.015</td>
<td>Over 5-1/2 to 6-1/2</td>
<td>1/8</td>
</tr>
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<td>Over 1-1/8 to 1-1/4</td>
<td>.011</td>
<td>.011</td>
<td>.016</td>
<td>Over 6-1/2 to 8-1/4</td>
<td>5/32</td>
</tr>
<tr>
<td>Over 1-1/4 to 1-3/8</td>
<td>.012</td>
<td>.012</td>
<td>.018</td>
<td>Over 8-1/4 to 9-1/2</td>
<td>3/16</td>
</tr>
<tr>
<td>Over 1-3/8 to 1-1/2</td>
<td>.014</td>
<td>.014</td>
<td>.021</td>
<td>Over 9-1/2 to 10</td>
<td>1/4</td>
</tr>
</tbody>
</table>

| Hexagons | | | | | | |
| To 1/2 | .007 | .007 | .011 | Over 1-1/2 to 2 | 1/32 | 1/64 | 1/32 |
| Over 1/2 to 1 | .010 | .120 | .015 | Over 2 to 2-1/2 | 3/64 | 1/64 | 3/64 |
| Over 1 to 1-1/2 | .021 | .130 | .025 | Over 2-1/2 to 3-1/2 | 1/16 | 1/64 | 1/16 |

<table>
<thead>
<tr>
<th>Cold Drawn Rounds</th>
<th>Cold Drawn Flats</th>
<th>Cold Drawn Hexagons</th>
<th>Cold Drawn Squares</th>
<th>Turned and Polished Rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Max. % Carbon</td>
<td>Max. % Carbon</td>
<td>Max. % Carbon</td>
<td>Max. % Carbon</td>
</tr>
<tr>
<td></td>
<td>Up to .28</td>
<td>Over .28</td>
<td>Width</td>
<td>Up to .28</td>
</tr>
<tr>
<td></td>
<td>or .55</td>
<td>or .55</td>
<td>or .55</td>
<td>or .55</td>
</tr>
<tr>
<td>To 1-1/2</td>
<td>.002</td>
<td>.003</td>
<td>.005</td>
<td>To 3/4</td>
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<tr>
<td>Over 1-1/2 to 2-1/2</td>
<td>.003</td>
<td>.004</td>
<td>.006</td>
<td>Over 3/4 to 1-1/2</td>
</tr>
<tr>
<td>Over 2-1/2 to 4</td>
<td>.004</td>
<td>.005</td>
<td>.007</td>
<td>Over 1-1/2 to 3</td>
</tr>
<tr>
<td>Over 4 to 6</td>
<td>.005</td>
<td>.006</td>
<td>.008</td>
<td>Over 3 to 4</td>
</tr>
<tr>
<td>Over 4 to 6</td>
<td>.008</td>
<td>.010</td>
<td>.020</td>
<td>Cold Drawn Squares</td>
</tr>
<tr>
<td>Over 6</td>
<td>.013</td>
<td>.015</td>
<td></td>
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</tr>
<tr>
<td>Cold Drawn Hexagons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To 3/4</td>
<td>.002</td>
<td>.003</td>
<td>.006</td>
<td>Cold Drawn Squares</td>
</tr>
<tr>
<td>Over 3/4 to 1-1/2</td>
<td>.003</td>
<td>.004</td>
<td>.007</td>
<td>Over 3/4 to 1-1/2</td>
</tr>
<tr>
<td>Over 1-1/2 to 2-1/2</td>
<td>.004</td>
<td>.005</td>
<td>.008</td>
<td>Over 1-1/2 to 2-1/2</td>
</tr>
<tr>
<td>Over 2-1/2 to 3-1/8</td>
<td>.005</td>
<td>.006</td>
<td>.009</td>
<td>Over 2-1/2 to 4</td>
</tr>
<tr>
<td>Turned and Polished Rounds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To 1-1/2</td>
<td>.002</td>
<td>.003</td>
<td>.005</td>
<td>Over 4 to 6</td>
</tr>
<tr>
<td>Over 1-1/2 to 2-1/2</td>
<td>.003</td>
<td>.004</td>
<td>.006</td>
<td>Over 6 to 8</td>
</tr>
<tr>
<td>Over 2-1/2 to 4</td>
<td>.004</td>
<td>.005</td>
<td>.007</td>
<td>Over 8 to 9</td>
</tr>
</tbody>
</table>
LIST OF MATERIALS FOR SHOP TESTS AND ILLUSTRATION

1. Observation Test: Sample of round bars with various surface finishes (cold finished, hot rolled, ground and polished)

2. Magnet Test: Sample of carbon steel, ferritic or martensitic stainless steel, austenitic stainless steel, aluminum, and nickel steel

3. Hardness Test: Sample of mild steel, medium carbon steel, high carbon steel, alloy steel, and tool steel

4. Scratch Test: Sample of mild steel, medium carbon steel, high carbon steel, alloy steel, and tool steel

5. File Test: Sample of mild steel, medium carbon steel, high carbon steel, alloy steel, and tool steel

6. Chemical Test: Sample of carbon steel, type 302 or 304 stainless steel, type 316 or 317 stainless steel

7. Spark Test: Sample of low carbon steel, high carbon steel, cast iron, high speed steel, tool steel, and manganese steel

8. Observation Test: Samples of bar stock (round and square), hot rolled sheet, cold finished coil strip, galvanized sheet, small diameter pipe, small diameter tubing, small gauge wire, hot rolled rod, and cold finished rod
I. Identify the following:
A. AISI
B. SAE
C. ASTM
D. ANSI
E. UNS

II. Complete the following charts:

A. Standard Steels and Alloy Steels

<table>
<thead>
<tr>
<th>AISI-SAE</th>
<th>APP. % CARBON</th>
<th>MAJOR ALLOYING ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex. 1020</td>
<td>.20</td>
<td>Only Carbon</td>
</tr>
<tr>
<td>Ex. 6118</td>
<td>.18</td>
<td>Chromium &amp; Vanadium</td>
</tr>
<tr>
<td>Ex. 4340</td>
<td>.40</td>
<td>Nickel, Chromium, Molybdenum</td>
</tr>
<tr>
<td>1. 1040</td>
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<td></td>
</tr>
<tr>
<td>2. 1095</td>
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<td>3. 1212</td>
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<td>4. 1340</td>
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<td>5. 2340</td>
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<td>6. 2512</td>
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<td>7. 3140</td>
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<td>8. 3310</td>
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<td>10. 4140</td>
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<tr>
<td>11. 4320</td>
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<td>12. 4620</td>
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<tr>
<td>13. 5135</td>
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<tr>
<td>14. 52100</td>
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</tr>
<tr>
<td>15. 6150</td>
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</tbody>
</table>
B. AISI-SAE-UNS Classification System

<table>
<thead>
<tr>
<th>AISI-SAE</th>
<th>UNS</th>
<th>TYPE METAL OR STEEL</th>
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</thead>
<tbody>
<tr>
<td>Ex.</td>
<td>1212</td>
<td>G12120</td>
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<tr>
<td>Ex.</td>
<td>48xx</td>
<td>G48xx0</td>
</tr>
<tr>
<td>Ex.</td>
<td>A6</td>
<td>T30106</td>
</tr>
<tr>
<td>1.</td>
<td>1527</td>
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<tr>
<td>2.</td>
<td>1151</td>
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<tr>
<td>3.</td>
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<td>G10290</td>
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<td>G41xx0</td>
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<td>G61500</td>
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<tr>
<td>9.</td>
<td>H21</td>
<td>T20821</td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td>T12002</td>
</tr>
<tr>
<td>11.</td>
<td>Sx</td>
<td>T4190x</td>
</tr>
<tr>
<td>12.</td>
<td>D2</td>
<td>T30402</td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td>T41906</td>
</tr>
<tr>
<td>14.</td>
<td>-----</td>
<td>Axxxxx</td>
</tr>
<tr>
<td>15.</td>
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</tr>
</tbody>
</table>

III. Answer the following questions:

A. What is the out-of-round tolerance for 2-1/2" diameter hot rolled bar?

B. What is the size tolerance for 1-3/4" cold finished hexagon bar made from 1045?

C. If the only requirements given you were 1" 1018 square bar with a size tolerance of -.006, would you choose hot rolled (much cheaper) or cold finished stock?
IV. Record the results of your shop test below.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Test Used</th>
<th>Kind of Metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
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</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TLD-D3-EX1
EXAM

1. Who is the AISI?

2. Who is the SAE?

3. What organization's classification system of aluminum and aluminum alloys is accepted by industry and used by commercial producers?

4. What organization has published a specification system for metals and alloys?

5. Name three classes of metals by manufacturing method, process, or material finish.

6. Identify four basic shapes that metals are produced in.

7. What do the first two digits of a steel name designate?

8. What do the last two digits (in a four-digit name) designate?

9. What is the approximate percent of carbon in 1045 carbon steel?

10. What is the approximate percent of carbon in 52100 chromium steel?

11. What type steel is 4147?

12. What is the alloying element in 2517 steel? What percent of that element is present?

13. If the element chromium makes steel stainless, why are the 5xxx and 5xxxx steels not included in the stainless steel group?

14. Name three types of stainless steel.
15. Which types are magnetic?

16. What element is added to austenitic stainless steels to improve ductility and other properties?

17. What type steel is indicated by the symbol W1 or A6?

18. What type tool steel is designated by the symbol D (category and group designations)?

19. What three groups of cold work tool steels are available?

20. What is the designation for water hardening tool steel?

21. Identify three categories of nonferrous alloys.

22. What category of nonferrous metals does brass and bronze belong to?

23. What does the first digit of an aluminum designation identify?

24. What are the basic temper designations and subdivisions for aluminum alloys?

25. Name 5 basic types of cast iron.

26. Name 2 basic types of steel castings.

27. What is the UNS designation for 1212 free cutting carbon steel?

28. What type metal are the T series numbers reserved for in the UNS numbering system?

29. What does a G as the first digit of a UNS classification designate?

30. What is the AISI-SAE classification for a G13300 steel?
31. When checking the hardness of a piece of steel with the file test, the file slides over the surface without cutting. What type steel is it most likely to be?

32. What can you determine about a metal by observation?

33. If an unknown sample can not be scratched by a piece of mild steel keystock but the keystock can be scratched by the sample, what conclusion can you draw about the sample?

34. If a hardness tester is not available, how can you determine relative hardness of a sample?

35. When spark testing a sample to determine carbon content, what does orange carrier lines ending in pear-shaped globules and very little branching indicate?

36. What is the out-of-round tolerance for 2-1/2" diameter hot rolled bar?

37. What is the maximum width of 1-1/4" key made from 1045 cold finished square bar? What is the minimum width?

38. What is the maximum diameter of a shaft made from 5" hot rolled 1018 bar? What is the minimum?

39. Name two other specification systems in use.

40. Define color coding and explain what it is used for.
TOOL AND DIE MAKER ... skilled workers who produce tools, dies, and special guiding and holding devices that are used in machines and produce a variety of products.

<table>
<thead>
<tr>
<th>Duties</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> Practice Safety</td>
<td>A-1 Follow safety manuals and all safety regulations/requirements</td>
</tr>
<tr>
<td><strong>B</strong> Apply Mathematical Concepts</td>
<td>B-1 Perform basic arithmetic functions</td>
</tr>
<tr>
<td><strong>C</strong> Demonstrate Quality Control and Management</td>
<td>C-1 Utilize appropriate inspection techniques</td>
</tr>
<tr>
<td><strong>D</strong> Demonstrate Knowledge of Manufacturing Materials</td>
<td>D-1 Identify materials with desired properties</td>
</tr>
<tr>
<td><strong>E</strong> Demonstrate Knowledge of Manufacturing Processes</td>
<td>E-1 Know operation of vertical and horizontal mills and tooling</td>
</tr>
<tr>
<td><strong>F</strong> Perform CNC Programming/CAM Tasks</td>
<td>F-1 Prepare and plan for CNC machining operations</td>
</tr>
<tr>
<td><strong>G</strong> Demonstrate Communication Skills</td>
<td>G-1 Use written communication</td>
</tr>
<tr>
<td><strong>H</strong> Perform Drafting/CAD Tasks</td>
<td>H-1 Demonstrate traditional mechanical drafting skills</td>
</tr>
<tr>
<td><strong>I</strong> Use Computers</td>
<td>I-1 Use computer operating systems</td>
</tr>
</tbody>
</table>

Duties and Tasks are described in detail to ensure comprehensive understanding of the role and responsibilities of a Tool and Die Maker.
<table>
<thead>
<tr>
<th>Duties</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>J: Interpret, review, and apply blueprint notes, dimensions, and tolerances</td>
<td>J-1 Interpret, review, and apply blueprint notes, dimensions, and tolerances</td>
</tr>
<tr>
<td></td>
<td>J-2 Interpret and understand basic layout/types of drawings</td>
</tr>
<tr>
<td></td>
<td>J-4 Ascertain job requirements from drawings</td>
</tr>
<tr>
<td>K: Perform Die Operations</td>
<td>K-1 Utilize basic die theory</td>
</tr>
<tr>
<td></td>
<td>K-2 Perform die repair</td>
</tr>
<tr>
<td></td>
<td>K-4 Demonstrate understanding of different types of industrial dies</td>
</tr>
</tbody>
</table>
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