

**ME 112: Scientific Programming
Spring Semester**

Type (check one): Required: Elective:

2005-2006 Catalog Data: ME 112. Scientific Programming. This course covers fundamental programming techniques used to solve engineering problems that require repetitive or iterative calculations. Emphasis is placed on writing structured, portable, efficient, and understandable Fortran programs. Also covered: interfacing Fortran codes with other languages and high-level applications, syntax for other computer languages. Corequisite: MATH 131. Offered in the Spring semester. *One semester; three credits*

Prerequisites: None

Co-Requisites: MATH 131

Textbook: Chapman, Stephen J., *FORTRAN 90/95 FOR SCIENTISTS AND ENGINEERS* 2nd ed., McGraw Hill, 2nd Ed., 2004, ISBN 0-07-282575-8.

Other Required Materials: None

Other References: None

Instructor: Dr. Joseph M. Londino, Assistant Professor of Mechanical Engineering

Course Objectives:

1. To teach programming techniques essential for mechanical engineers
2. To teach mechanical engineering problem solving
3. To introduce fundamental concepts in data structures and program design

Prerequisites by Topics: 1. Algebra and trigonometry

Topics:

1. Survey of computer applications
2. Files, directories, and the screen
3. Introduction to compiled language
4. Language Elements
5. Expressions and assignments
6. Control Constructs
7. Program units and procedures
8. Common blocks and modules
9. Array features
10. Specification statements
11. Intrinsic procedures
12. Data transfer
13. Interfacing with other languages and applications

Class Schedule: Three 50-minute sessions per week

Prepared by: Dr. Joseph. M. Londino

Date: 12-Jan-05

**Professional Component:
ME 1112 – Scientific Programming**

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Some <input type="checkbox"/> None
Realistic Constraints (check all that apply)	<input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice