IMPERIAL COMMUNITY COLLEGE DISTRICT
IMPERIAL VALLEY COLLEGE

COURSE OUTLINE

DIVISION: Science, Mathematics and Engineering **DATE:** September 2000

COURSE TITLE: Programming in FORTRAN **COURSE NO.:** Math 130 **UNITS:** 3

LEC HRS. 3 **LAB HRS.** _____ **HRS. TBA**

If cross-referenced, please complete the following

COURSE NO.(s) _____ **COURSE TITLE**

I. COURSE/CATALOG DESCRIPTION:

A practical course covering the fundamentals of the FORTRAN programming language as adapted to a variety of applications.

II. A. PREREQUISITES, if any:

B. COREQUISITES, if any:

C. RECOMMENDED PREPARATION, if any:

Math 090 with a grade of "C" or better

III. GRADING CRITERIA:

X Course must be taken on a "letter-grade" basis only.

_____ Course may be taken on a "credit" basis or for a letter grade.

_____ Course must be taken on a "credit" basis only.

IV. MEASURABLE COURSE OBJECTIVES AND MINIMUM STANDARDS FOR GRADE OF "C":

1. The student will identify the basic components of a computer and explain the underlying principles of programming and the art of debugging.
2. The student will demonstrate a basic knowledge of the building blocks of the FORTRAN language.
3. The student will apply the rules and regulations associated with the building of arithmetic statements in FORTRAN.
4. The student will summarize the concepts and processes associated with input and output formulations.
5. The student will demonstrate a logical and systematic foundtion of programming techniques in a step-by-step manner.
6. The student will recognize a variety of decision-type statements and will utilize them in a most efficacious fashion.
7. The student will identify the essential features of the DO-loop.
8. The student will apply the basic and useful techniques of array formation and usage in various dimensions, and will recognize relevant declaration statements.
9. The student will demonstrate the many diverse format types useful in input and output descriptions.
10. The student will differentiate and use the various types of functions, sub-programs, and subroutines.

V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

CORE CONTENT	APPROX. % OF COURSE
1. Overview of general concepts A. Computer operations B. Programming C. Flowcharting D. Language structure E. Debugging F. Documentation	10%
2. Defining symbolism and labeling A. FORTRAN program records B. Character set for FORTRAN C. Constants and variables D. Identifiers	10%
3. FORTRAN arithmetic statements A. Order of operations B. Arithmetic operations C. Replacement statements D. Intrinsic functions	10%
4. Inputs and outputs A. Statements B. Formal statements C. Input and output of alphanumeric data	10%
5. Programs and their structures A. Structure of the program B. Algorithms C. Top-down programming	10%
6. Control statements A. Statement of GO TO type B. Logical operations C. Logical IF statements	10%
7. The DO statement A. The concept of repetition B. DO-loop syntax C. Usage of DO-loops D. Nested DO-loops	10%
8. Nature and use of arrays A. One-dimensional arrays B. Multi-dimensional arrays C. Use of matrices in processing and storing information D. Array syntax as applied to DIMENSION, TYPES, DATA and EQUIVALENCE statements	10%
9. Formatting A. The FORMAT statement B. Field descriptors C. Output representation and editing	10%
10. FUNCTIONS sub-programs, SUBROUTINES and relevant declarations A. Intrinsic functions B. Statement functions C. Subprogram functions D. SUBROUTINES E. COMMON and EXTERNAL declarations	10%

VI. METHOD OF EVALUATION TO DETERMINE IF OBJECTIVES HAVE BEEN MET BY STUDENTS: (check all that apply)

Essay	X	**Class Activity**	X	**Written Assignments**	X
Problem Solving Exercise	X	**Final Exam**	X	**Oral Assignments**	X
Skill Demonstration	X	**Objective**	X	**Quizzes**	X
Other	X				

VII. INSTRUCTIONAL METHODOLOGY: (Check all that apply)

Lecture	X	**Discussion**	X	**Demonstration**	X
Audio Visual	X	**Group Activity**	X	**Lab Activity**	X
Computer Assisted Instruction	X	**Individual Assistance**	**Simulation/** X	**Case Study**	X

Two (2) hours of independent work done out of class per each hour of lecture or class work, or 3 hours lab, practicum, or the equivalent per unit. _____

Other

VIII. TEXTBOOK(S) AND SUPPLEMENT(S):

Brooks. *Problem Solving with Fortran 90.* Springer Verlag, 1997.

Forsythe. *Contemporary Computing for Engineers and Scientists Using Fortran 90.* PWS Publishing, 1997.

Myler. *Fundamentals of Engineering Programming with C and Fortran.* Cambridge University Press, 1998.

Smith. *Programming in Fortran 90.* Springer Verlag, 1997.

Wille, *Advanced Scientific Fortran*. John Wiley and Sons, 1999.