**OFFICIAL COURSE OUTLINE INFORMATION**

Students are advised to keep course outlines in personal files for future use.

<table>
<thead>
<tr>
<th>FACULTY/DEPARTMENT:</th>
<th>PHYSICS 381</th>
<th>PHYSICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COURSE NAME/NUMBER</td>
<td>MATHEMATICAL PHYSICS</td>
<td></td>
</tr>
<tr>
<td>FORMER COURSE NUMBER</td>
<td>UCFV CREDITS</td>
<td>3</td>
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</tbody>
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**CALENDAR DESCRIPTION:**

The object of this course is to give the student a wide arsenal of mathematical techniques, tools and tricks to increase their ability in setting up and solving problems from scratch. The solution of partial differential equations with applications to many areas of physics is the biggest single theme of the course. Also included will be special functions, calculus of variations and integral equations. Students may obtain credit for either Math 381 or ENGR 381, but not both.

**PREREQUISITES:** (PHYS 112, MATH 211, MATH 310) or (PHYS 112, PHYS 221, MATH 211)

**SYNONYMOUS COURSE(S)**

(a) Replaces: MATH 310

(b) Cannot take: Phys 381/Math 381 for further credit.

**TOTAL HOURS PER TERM:** 60

**TRAINING DAY-BASED INSTRUCTION**

<table>
<thead>
<tr>
<th>LECTURES: 60 Hrs</th>
<th>SEMINAR: Hrs</th>
<th>LABORATORY: Hrs</th>
<th>FIELD EXPERIENCE: Hrs</th>
<th>STUDENT DIRECTED LEARNING: Hrs</th>
<th>OTHER (SPECIFY): Hrs</th>
</tr>
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**MAXIMUM ENROLLMENT:** 24

**EXPECTED FREQUENCY OF COURSE OFFERINGS:**

- Will transfer credit be requested? (lower-level courses only)
  - Yes [ ]
  - No [ ]

- Will transfer credit be requested? (upper-level requested by department)
  - Yes [ ]
  - No [ ]

- Transfer credit exists in BCCAT Transfer Guide?
  - Yes [ ]
  - No [ ]

**AUTHORIZED SIGNATURES:**

- Course Designer(s): T. Cooper
- Chairperson: N. Weinberg (Curriculum Committee)
- Department Head: G. McGuire
- Dean: K. Wayne Welsh
- PAC Approval in Principle Date: PAC Final Approval Date: February 25, 1998
LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:
To give the student the ability to model a system, physical or otherwise, as a series of mathematical equations. To give the student the ability to solve these equations.

METHODS:
Lecture, demonstration, small group practice, discussion, audiovisual presentation, use of models and charts.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):
Credit can be awarded for this course through PLAR (Please check:)  ☐ Yes  ☐ No

METHODS OF OBTAINING PLAR:

TEXTBOOKS, REFERENCES, MATERIALS:
[Textbook selection varies by instructor. An example of texts for this course might be:]
Advanced Mathematics for Scientists and Engineers, Murray R. Spiegel

SUPPLIES / MATERIALS:

STUDENT EVALUATION:
[An example of student evaluation for this course might be:]
Assignments  25%
Midterm  30%
Final exam  45%

COURSE CONTENT:
[Course content varies by instructor. An example of course content might be:]
1. A week of review including tricks of interchanging limits (differentiating under the integral sign, integrating series term by term, etc.). Introduction to the big D operator techniques for solving differential equations.
2. Fourier Series.
3. Fourier Integrals.
4. Special Functions I (Gamma, Beta, Ei, Si, Erf).
5. Special Functions II (Bessel functions, Legendre, Hermite, Laguerre polynomials) Sturm-Lioville systems.
7. Calculus of Variations and applications.