### Course Outline Information

**OFFICIAL COURSE OUTLINE INFORMATION**

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

| Shaded headings are subject to change at the discretion of the department and the material will vary - see course syllabus available from instructor |

<table>
<thead>
<tr>
<th>FACULTY/DEPARTMENT:</th>
<th>Faculty of Science, Health &amp; Human Services / Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>COURSE NAME/NUMBER:</td>
<td>PHYS 381</td>
</tr>
<tr>
<td>FORMER COURSE NUMBER:</td>
<td>MATH 381, ENGR 257</td>
</tr>
<tr>
<td>UCFV CREDITS:</td>
<td>3</td>
</tr>
<tr>
<td>COURSE DESCRIPTIVE TITLE:</td>
<td>Mathematical Physics</td>
</tr>
</tbody>
</table>

**CALENDAR DESCRIPTION:**

This course will give students a wide arsenal of mathematical techniques and tools to increase their ability in setting up and solving problems. The solution of partial differential equations with applications to many areas of physics is the biggest single theme of the course.

**NOTE:** This course is offered as PHYS 381, MATH 381, and ENGR 257.

**PREREQUISITES:** MATH 211, and one of (PHYS 221, MATH 255) and either PHYS 112 or any other second year Math course

**COURSE SYNOPSIS:**

**COREQUISITES:**

**SYNONYMOUS COURSE(S):**

(a) Replaces: n/a
(b) Cannot take: MATH 381, ENGR 257 for further credit.

**SERVICE COURSE TO:**

<table>
<thead>
<tr>
<th>(Course #)</th>
<th>(Department/Program)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL HOURS PER TERM:** 75

**TRAINING DAY-BASED INSTRUCTION**

<table>
<thead>
<tr>
<th>STRUCTURE OF HOURS:</th>
<th>HOURS PER DAY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures: 75 Hrs</td>
<td></td>
</tr>
<tr>
<td>Seminar: Hrs</td>
<td></td>
</tr>
<tr>
<td>Laboratory: Hrs</td>
<td></td>
</tr>
<tr>
<td>Field Experience: Hrs</td>
<td></td>
</tr>
<tr>
<td>Student Directed Learning: Hrs</td>
<td></td>
</tr>
<tr>
<td>Other (Specify): Hrs</td>
<td></td>
</tr>
</tbody>
</table>

**MAXIMUM ENROLLMENT:** 24

**EXPECTED FREQUENCY OF COURSE OFFERINGS:** once per year

**WILL TRANSFER CREDIT BE REQUESTED?** (lower-level courses only) No

**WILL TRANSFER CREDIT BE REQUESTED?** (upper-level requested by department) No

**TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:** Yes

**COURSE IMPLEMENTATION DATE:** September 1994

**COURSE REVISED IMPLEMENTATION DATE:** September 2006

**COURSE TO BE REVIEWED:** November 2009

**UPAC Approval in Principle Date:** May 26, 2006

**UPAC Final Approval Date:** May 26, 2006

**AUTHORIZATION SIGNATURES:**

Course Designer(s): Tim Cooper/Peter Mulhern

Chairperson: Gillian Mimmack (Curriculum Committee)

Department Head: Norm Taylor

Dean: Jackie Snodgrass

UPAC Approval in Principle Date: May 26, 2006

UPAC Final Approval Date: May 26, 2006
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, computer simulation, 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:
Please see the Physics PLAR policy on the department’s webpage

Textbooks, References, Materials:
[Textbook selection varies by instructor. An example of texts for this course might be:]
C. Ray Wylie and Louis C. Barrett, Advanced Engineering Mathematics
Murray R. Spiegel, Advanced Mathematics for Scientists and Engineers

Supplies / Materials:

Student Evaluation:
[An example of student evaluation for this course might be:]
Assignments 20%
Midterm 30%
Final exam 50%

Course Content:
[Course content varies by instructor. An example of course content might be:]
Complex numbers: Leibnitz rule and apps to integration
Ordinary Differential Equations with constant coefficients using operator techniques
Fourier Series
Waves on Strings, Separate Variables
One Dimensional Heat Flow, Laplace’s equation in cartesian and polar co-ordinates for finite systems
Special functions of physics (delta, Ei(x), erf(x), etc.)
Fourier Transforms, basic theorem, application to integration, Parseval
One dimensional heat flow and Laplace’s equation for infinite systems
Laplace equation in three dimensions and solutions as expansions; Sturm Liouville systems