Course specification

University/Academy: Damanhour University
Faculty/Institute: Science
Department: Mathematics

1. course Data:

<table>
<thead>
<tr>
<th>Course code:</th>
<th>Math361</th>
<th>Course title:</th>
<th>Ordinary and Partial Differential Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Academic year/level:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2009-2010</td>
<td></td>
</tr>
<tr>
<td>Specialization:</td>
<td>Special Physics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of instructional units:</td>
<td>lecture 2</td>
<td>tutorial 1</td>
<td>practical 2</td>
</tr>
</tbody>
</table>

2. course Aim

Demonstrate theoretical knowledge and have practical skills that will be required for dealing with differential equation and its applications in physics. Reformulate some applied physical problems in which it takes a form of a differential equation and solving this model.

3. Intended learning outcome

a) Knowledge and understanding

- a1. Define the nature and operations of Differential equations.
- a2. Review theories and concepts used in the Differential equations.
- a3. Identify the steps required to carry out a piece of research on a topic within Differential equations.
- a5. Review the contribution and impacts of the differential equations in physics.

b) Intellectual skills

- b1. Apply appropriate theories, principles and concepts relevant to the Differential equations.
- b2. Assess and evaluate the literature within Differential equations.
- b3. Manipulate information from a variety of sources relevant to Differential equations.
|   | b4. Use appropriate judgment in selecting and presenting information using various methods relevant to Differential equations.  
|   | b5. Summarize a reasoned argument to the solution of familiar and unfamiliar problems relevant to Differential equations.  
| c) Professional skills | c1. Plan practical activities using techniques and procedures appropriate to Differential equations.  
|   | c2. Communicate a piece of independent research using mathematics media and techniques.  
| d) General skills | d1. Work effectively as part of a group, involving leadership, group dynamics and interpersonal skills such as listening, negotiation and persuasion relevant to application of differential equations.  
|   | d2. Use organization skills (including task and time management) relevant to differential equations both individually and in a group situation.  
|   | d3. Set tasks and solve problems relevant to differential equations using ideas and techniques some of which are at the forefront of the discipline.  
| 4. course content | Linear differential equations with Constant Coefficients.  
|   | Linear differential equations with variable Coefficients, variation of parameters, undetermined coefficients.  
|   | System of Simultaneous linear differential equations.  
|   | Series Solutions of differential equations.  
|   | Total Differential Equations.  
|   | Linear partial differential equations of order one.  
|   | Linear partial differential equations of higher order with constant coefficients.  

<table>
<thead>
<tr>
<th><strong>Non-homogenous Linear differential equations with constant coefficients.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linear partial differential equations of higher order with variable coefficients.</strong></td>
</tr>
<tr>
<td><strong>Boundary value problems.</strong></td>
</tr>
<tr>
<td><strong>Laplace Transform.</strong></td>
</tr>
<tr>
<td><strong>Special integral equations.</strong></td>
</tr>
<tr>
<td><strong>Existence and uniqueness of the solution.</strong></td>
</tr>
</tbody>
</table>

5. **Teaching and learning methods**

5.1 Lectures.
5.2 Tutorials
5.3 Homework
5.4 Oral discussion

6. **teaching and learning methods for students with special needs**

None

7. **Student Assessment**

a) **Procedures used:**
Final exam

b) **Schedule:**
Assessment 1 Final exam Week 15

c) **Weighing of Assessment:**
Final exam 100 Marks (100%)

**List of Textbooks and References:**

d) **Course Notes**
Course notes provided by the staff member of Math department, to be handed at the beginning of the semester.

e) **Required Books (Textbooks)**
Earl D. Rainville and Phillip E. Bedient, Elementary Differential Equations, Macmillan Publishing Company,
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>f) Recommended Books</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>g) Periodicals, web sites,…,etc</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

**Course Instructor:** Prof. Dr. Mohamed Shaaban

**Head of Department:** Prof. Dr. Mohamed Darwish

**Date:** / /