COURSE SPECIFICATIONS (2010-2011)

Benha University  Faculty of Engineering at Shobra  Mechanical Engineering Department

A- Basic Information

Course Title: Engineering Mathematics (1)  Code: EMP191
Lecture: 4  Tutorial: 2  Practical:  Total: 6
Program on which the course is given: B.Sc. Mechanical Engineering (Productions)
Major or minor element of program: Major
Department offering the program: Mechanical Engineering Department
Department offering the course: Physics and Sciences Department
Academic year / level: First Year / First Semester
Date of specifications approval: 10/5/2006

B- Professional Information

1- Overall aims of course:
   Write the aims of the course here ...
   • To discuss the basic concepts of infinite series.
   • To discuss the basic concepts of function of several variables.
   • To discuss the basic concepts of vector analysis.
   • To discuss the basic concepts of ordinary differential equations.
   • To discuss the basic concepts of series solution of ordinary differential.

2- Intended learning outcomes of course (ILOs)
   By completion of the course, the student should be able to:

   a- Knowledge and Understanding
      a.1) Concepts and theories of mathematics and sciences, appropriate to the discipline.
      a.5) Methodologies of solving engineering problems, data collection interpretation.

   b- Intellectual Skills
      b.1) Select appropriate mathematical and computer-based methods for modeling and analyzing problems.
      b.2) Select appropriate solutions for engineering problems based on analytical thinking.
      b.7) Solve engineering problems, often on the basis of limited and possibly contradicting information.

   c- Professional and Practical Skills
      c.1) Apply knowledge of mathematics, science, information technology, design, business context and engineering practice to solve engineering problems.
      c.7) Apply numerical modeling methods to engineering problems.

   d- General and Transferable Skills
      d.1) Collaborate effectively within multidisciplinary team.
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3- Contents

<table>
<thead>
<tr>
<th>Topic No.</th>
<th>Topic</th>
<th>Weeks</th>
<th>ILO’s</th>
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<tbody>
<tr>
<td>1</td>
<td>• Infinite series and expansion of functions.</td>
<td>2</td>
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<tr>
<td>2</td>
<td>• Functions of several variables: partial differentiation, maximum and minimum values, Lagrange’s multipliers and conditional extrema, envelopes.</td>
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<td>3</td>
<td>• Vectors analysis: Gradient of scalar fields, Divergence and Curl of vector fields, Green's - Gauss's - Stoke's theorems.</td>
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<td>4</td>
<td>• Ordinary Differential Equations: First order and higher order Differential Equations.</td>
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<tr>
<td>5</td>
<td>• Series solution of Ordinary Differential Equations</td>
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<td>6</td>
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<td>7</td>
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<td></td>
<td>Total</td>
<td>14 weeks</td>
<td>84 hours</td>
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4- Teaching and Learning Methods

Lectures
Practical training / laboratory
Seminar / workshop
Class activity
Case study
Assignments / homework

5- Student Assessment Methods

Assignments to assess knowledge and intellectual skills.
Quiz to assess knowledge, intellectual and professional skills.
Mid-term exam to assess knowledge, intellectual, professional and general skills.
Oral exam to assess knowledge and intellectual skills.
Final exam to assess knowledge, intellectual, professional and general skills.

Assessment Schedule

Assessment 1 on weeks 2, 5, 9, 11
Assessment 2 Quizzes on weeks 4, 6, 10, 12
Assessment 3 Mid-term exam on week 8
Assessment 4 Oral Exam on week 14
Assessment 5 Final exam on week 15

Weighting of Assessments

05% Home assignments
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<table>
<thead>
<tr>
<th>Percentage</th>
<th>Component</th>
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<tbody>
<tr>
<td>05%</td>
<td>Quizzes</td>
</tr>
<tr>
<td>10%</td>
<td>Mid-term examination</td>
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<tr>
<td>20%</td>
<td>Oral examination</td>
</tr>
<tr>
<td>60%</td>
<td>Final-term examination</td>
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<tr>
<td>100%</td>
<td>Total</td>
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6- List of References

Course notes
  - Course Notes • Lecture material and training sheets

Essential books

Recommended books
  - Recommended Books


7- Facilities required for teaching and learning

Lecture room equipped with overhead projector
Presentation board, computer and data show
Laboratory

Course coordinator: Dr. Dr. Fathi Abdessalam and Dr. Khaled El Naggar
Course instructor: Dr.
Head of Department: Prof. Dr. Maher Hegazy Date: December 5, 2011