COURSE CODE: MATH207  COURSE LEVEL: FALL 2013-2014
COURSE TITLE: ORDINARY DIFFERENTIAL EQUATIONS
COURSE TYPE: Area Core

LECTURER(S):
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CREDIT VALUE: (4,1) ECTS VALUE: 4
PREREQUISITES: Math151, Math 106
COREQUISITES:

DURATION OF COURSE: 1 semester
WEB LINK: http://brahms.emu.edu.tr/math207

CATALOGUE DESCRIPTION

AIMS & OBJECTIVES
The main aim of this course is to provide students with an introductory yet comprehensive overview of basic theory of ordinary differential equations, and to introduce the methods of classification and finding the solutions to different classes of differential equations. It also provides an opportunity to improve the students’ ability of analyzing and problem-solving skills.

GENERAL LEARNING OUTCOMES (COMPETENCES)
On successful completion of this course, all students will have developed knowledge and understanding of:
- Main concepts of theory of existence of solutions to different types of differential equations;
- Basic methods of classification of different types of differential equations;
- Methods of solving the differential equations of the types for which the exact solutions are obtainable;
- Methods of finding the series solutions to the certain type of differential equations;
- Basic theory of linear differential equations and systems of linear differential equations.
- Basic theory of Fourier expansions.

On successful completion of this course, all students will have developed their skills in:
- Classifying the different types of differential equations;
- Solving the differential equations of the first order for which the solution can be obtained in the closed form;
- Solving the linear equations by different methods acquired in this course;
- Solving homogeneous and non-homogeneous linear systems.
- Expanding Fourier series
- Solving Heat and Wave equations

On successful completion of this course, all students will have developed their appreciation of and respect for values and attitudes regarding the issues of:
- Knowledge on theory and qualitative analysis of differential equations
- Connections between the different aspects in the analysis of differential equations, suitability and limitations of different methods of analysis for different purposes
- Ethical behaviour and social communication

GRADING CRITERIA
85–100 (A); 80–84 (A-); 75–79 (B+); 70–74 (B); 66–69 (B-); 63–65 (C+); 60–62 (C); 57–59 (C-); 54–56 (D+); 50–53 (D); 45–49 (D- /FAIL); 0–44 (F/FAIL).

RELATIONSHIP WITH OTHER COURSES
This course is designed for the students of engineering faculty. It is related to Calculus, Linear Algebra courses and it is useful in the departmental courses.

LEARNING / TEACHING METHOD
Lectures, problem solving, tutorials, class discussion

ASSIGNMENTS
Regular home assignments

METHOD OF ASSESSMENT
First Midterm Exam: 25% PERIOD November 23- December 04, TBA by the University Exam Committee
Second Midterm Exam: 25% DECEMBER 30, Monday 14:30-16:20
Attendance : 5%
Home-Works : 5%
Final Exam : 40%  PERIOD January 14-29, TBA by the University Exam Committee

ATTENDANCE  Make-up exams will be given after the midterms, respectively. Student missing an exam should provide a valid excuse within three days after the exam. Attendance is compulsory. Any student who has poor attendance and/or misses an exam without a valid excuse may be given an NG grade.

TEXTBOOK/S
S.L. Ross “Introduction to Ordinary Differential Equations”, Ed.

INDICATIVE BASIC READING LIST

EXTENDED READING LIST

SEMESTER OFFERRED  2013-2014 Fall Semester

CONTENT & SCHEDULE
Lectures will be held on Mondays (14:30 – 16:20), Tuesdays (12:30 – 14:20) and Thursdays (10:30-12:20)

The lecture topics within the semester are as in the following schedule:

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<tr>
<th>WEEK</th>
<th>TOPICS</th>
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<tr>
<td>1</td>
<td>Chapter1. Differential Equations and Their Solutions: 1.1 Classification of differential equations; their origin and application 1.2 Solutions 1.3 Initial-value problems, boundary-value problems, the existence and uniqueness theorem</td>
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<tr>
<td>2</td>
<td>Chapter2. First-Order equations for which Exact Solutions are Obtainable: 2.1 Exact differential equations 2.2 Separable equations and equations reducible to this form</td>
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<td>3</td>
<td>RELIGIOUS HOLIDAY ( EID AL-ADHA )</td>
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<tr>
<td>4</td>
<td>2.3 Linear and Bernoulli equations</td>
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<td>5</td>
<td>Chapter 4. Explicit Methods of Solving Higher-Order Linear Differential Equations 4.1 Basic theory of linear differential equations 4.2 The homogeneous linear equation with constant coefficients</td>
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<td>6</td>
<td>4.3 The method of undetermined coefficients 4.4 Variation of parameters</td>
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<td>7</td>
<td>4.5 The Cauchy-Euler equation Chapter 9. Laplace Transform 9.1 Definition, existence, and basic properties of the Laplace transform</td>
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<td>8-9</td>
<td>Midterm Examinations</td>
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<tr>
<td>10</td>
<td>9.2 The inverse transform and the convolution 9.3 Laplace transform solution of linear differential equations with constant coefficients</td>
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<td>11</td>
<td>Chapter 6. Series Solutions of Linear Differential Equations 6.1 Power series solutions about an ordinary point</td>
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<td>12</td>
<td>6.2 Solutions about singular point; the method of Frobenius</td>
</tr>
<tr>
<td>13</td>
<td>Chapter 7. System of Linear Differential Equations 7.1 Differential operators and an operator method 7.3 Basic theory of linear systems in normal form; two equations in two unknown functions</td>
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<td>14</td>
<td>7.4 Homogenous linear systems with constant coefficients: two equations in two unknown functions</td>
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<td>15</td>
<td>Introduction and Basic Definitions, Classification. The Heat Equation. Fourier Series</td>
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<td>16-17</td>
<td>Final Examinations</td>
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PLAGIARISM
This is intentionally failing to give credit to sources used in writing regardless of whether they are published or unpublished. Plagiarism (which also includes any kind of cheating in exams) is a disciplinary offence and will be dealt with accordingly.

ANY OTHER USEFUL INFORMATION (SUCH AS STUDIO RULES, MAKE-UP EXAMS, STUDENTS' RESPONSIBILITIES, EQUIPMENT OR MATERIAL NEEDED, SITE TRIPS, ETC.)