Department of Mathematics

Course Profile

Course Number: MATH 322	**Course Title: Special Functions**
Required / Elective: Elective	**Pre-requisite:** None
Catalog Description: Gamma and Beta functions; hypergeometric series and functions; confluent hypergeometric functions, generalized hypergeometric functions; Bessel's functions; Legendre's functions.	**Textbook / Required Material:** Andrews E.G.,Askey R., Roy R. *Special Functions.* Cambridge University Press, 2000

Course Structure / Schedule: (3+0+0) 3 / 7 ECTS

Extended Description:

Gamma and Beta functions and their properties. Hypergeometric series and functions. Singular Sturm-Liouvilli problem. Special functions as eigenfunctions of this problem. Generating functions for Bessel and Legendre functions. Orthogonal properties of these functions. Fourier-Bessel expantion.

Design content: None	**Computer usage:** No particular computer usage required.

Course Outcomes: By the end of the course the students should be able to:

1. provide an adequate comprehension and appreciation of the usefulness of special functions. **[3, 6]**
2. solve problems taken from various areas of engineering and applied physics by using differential equations. **[2,3, 6]**

[2] demonstrate knowledge of mathematics to construct, analyze and interpret mathematical models,
[3] demonstrate the ability to apply mathematics to the solutions of problems,
[6] have a basic knowledge of the main fields of mathematics, including analysis, algebra, differential equations, differential geometry.

Recommended reading:

Gradshtein I.S. ,Ryzhik.I.M. Table of integrals, sums, series and products. Academic press.

Abramovitz, M. Stegun. Table of mathematical functions.

Teaching methods:

Pre-readings and lectures.

Assessment methods:

Midterm exams, final exam

Student workload:

Preparatory reading ..... 65 hrs Lectures .....……. 45 hrs Discussions .....28 hrs Homework..... 30 hrs Midterm Exams ..... 4 hrs Final Exam .....……. 3 hrs **TOTAL …… 175 hrs … to match 25 x 7 ECTS**	
Prepared by: Elman Hasanoğlu	Revision Date: 08.02.2010