

COURSE SYLLABUS

Mathematical Physics

4200004

COURSE DETAILS

Campus: Beer Sheva	Academic year: 2020
Department: Electrical and Electronics Engineering 2nd degree	Type of Course: Required
Discipline:	Level of Course: Graduate
Year of Study: First	Mode of Delivery: Face to face
Semester: B	Prerequisites:
Credit: 3	Co-Requisites:
ECTS Credit Points: 4.5	Language of Instruction: English
Lecturer(s): VICTOR Kagalovsky victork@sce.ac.il	Work Placement(s):
	Teaching Assistant(s):

AIM

Students will learn advanced mathematical methods for the solution of physical problems and will gain the ability to understand and properly formulate physics problems, and to solve typical exercises based on the laws of physics, using special mathematical methods for their solution.

LEARNING OUTCOMES

On successful completion of the course, the students will be able to:

1. Formulate physical problems in mathematical language.
2. Solve basic exercises using various methods of mathematical physics.
3. Use variational calculus, as well as differential equations, in their Electrical Engineering projects.
4. Use Fourier series and Fourier integrals for signal processing in Electrical Engineering.
5. Solve Laplace and Poisson equations for electromagnetic fields.

COURSE CONTENTS

Week	Subject	Relevant Reading
1	Basics of variational calculus	[1] Ch.22
2	Conservation laws and corresponding mathematical equations	[1] Ch.11
3	Approximations based on variational calculus	[1] Ch.22
4	Linear ordinary differential equations	[1] Ch.14, 15
5	Space Spectrum of solutions	[1] Ch.16, 17
6	Fourier spectrum, Green's functions	[1] Ch.12
7	Partial differential equations	[1] Ch.18,19
8	Dirichlet problem	[1] Ch.18,19
9	Poisson and Laplace equations	[1] Ch.17,18,19
10	Complex functions	[1] Ch.20
11	Integral equations of two kinds	[1] Ch.23
12	Laplace and Fourier transforms	[1] Ch.13
13	Theory of perturbation	[1] Ch. 28

RECOMMENDED OR REQUIRED READING

Text book:

1. Riley, K.F. Hobson, M. P. & Bence, S. J. *Mathematical Methods for Physics and Engineering* (Cambridge University Press), 1997

Other readings:

2. Arfken, G.B. Weber, H.J. *Mathematical Methods for Physicists* (Academic Press Elsevier), 1966

PLANNED LEARNING ACTIVITIES AND TEACHING METHODS

Lecture hours: 3. The course will be taught face to face.

ASSESSMENT METHODS AND CRITERIA

Criterion	Percentage	Comments
Final Exam:	100%	