FIZ321E MATHEMATICAL METHODS in PHYSICS-I 2019-20 SPRING TERM

LECTURER: Dr. Hakkı Tuncay ÖZER

REFERENCES:

- ❖ G.B. Arfken, H.J. Weber, Mathematical Methods for Physicists, Harcourt Academic Press, 5th edition, October 2000.
- ❖ J. Mathews and R.L. Walker, Mathematical Methods of Physics, Addison-Wesley, (second edition)1969.
- ❖ L.A. Pipes & Harvill L.R. Applied Mathematical for Engineers and Physicists– International student edition, Tata McGraw Hill Pub. Co.,(1970.)
- ❖ James Ward Brown and Ruel V. Churchill ,Complex Variables and Applications, Ninth Edition, McGraw-Hill, 2013.
- ❖ P. Dennery , A. Krzywicki, Mathematics for Physicists, Dover Publications, 1996.

OUTLINE
- ✓ **Complex Analysis:** Complex numbers,
- ✓ Basic operations with complex functions, analytic functions.
- ✓ Cauchy theorem,
- ✓ Singularities,
- ✓ Taylor and Laurent series,
- ✓ Residue theorem and applications,
- ✓ Complex functions.
- ✓ **Linear vector spaces**, function spaces, Gram-Schmidt orthogonalisation.
- ✓ **Second order differential equations:** introduction,
- ✓ Singularities and series solutions,
- ✓ Frobenius method,
- ✓ Special functions: cylindrical and spherical coordinates,
- ✓ **Sturm-Liouville problem**. Bessel, Neumann, Modified Bessel functions,
- ✓ Legendre polynomials, associated Legendre functions, spherical harmonics.
- ✓ Fourier- Legendre series,
- ✓ Asymptotic behaviors of certain special functions.

Homework: There will be homework sets every week.

Exam Schedule & Contents;

Midterm (April 9 th, Tuesday)

Final exam (Date will be posted by Automation Office of Student Afffairs)

Grading: Homeworks-5% ,   **Weekly exams - 25%,**   Midterm-30%,   **Final exam %40**

Office hours: Tuesday 13:30-14:30, Thursday 13:30-14:30

Attendance: 70% of lecture hours will be required.