

**Tennessee Technological University**  
**Mathematics Department**

**MATH 6530: Integral Equations and Applications**

**I. COURSE DESCRIPTION FROM CATALOG:**

Linear Integral Equations: Volterra and Fredholm Types. Green's Functions. Hilbert-Schmidt and Fredholm Theories. Neumann Series. Iterative Methods. Lec. 3. Cr. 3.

**II. PREREQUISITE(S):**

Consent of instructor

**III. COURSE OBJECTIVE(S):**

This course is designed to provide instruction in techniques used in solving integral equations commonly encountered in natural sciences and engineering.

**IV. STUDENT LEARNING OUTCOMES:**

Graduate students in mathematics and other interested scientists get to expose the rudiments of the subject. Students learn to identify integral equations by their types. Students will be able to convert applied research models by PDE into models by Integral Equations, and vice versa. Students learn methods of solving integral equations of different types and learn basic theorems concerning the existence and uniqueness of the solutions. Upon successfully completion the course, students is able to applied techniques learned to their related researches.

**V. TOPICS TO BE COVERED:**

1. Integral Equations, Origin, and Basic Tools
2. Modeling of Problems as Integral Equations
3. Volterra Integral Equations
4. The Green's Equations
5. Fredholm Integral Equations
6. Existence of the Solutions: Basic Fixed Point Theorems

**VI. ADDITIONAL INFORMATION:**

First fifteen minutes (if needed) of each class period will be devoted to answer questions either on homework or anything related to the material that was covered in the previous classes. Remaining time is used to lecture on the new material. Occasionally students may be asked to solve problems or present ideas on the chalkboard.

**VII. POSSIBLE TEXTS AND REFERENCES:**

*Introduction to Integral Equations with Applications*, 2<sup>nd</sup> edition, by Abdul J. Jerri, John Wiley & Sons, 1999

*Integral Equations* by Harry Hochstadt, John Wiley & Sons, 1973

*Method of Applied Mathematics* by F.B. Hilderbrand, Prentice-Hall, 1961

*A Course on Integral Equations* by A.C. Pipkin, Springer-Verlag, 1991

*Integral Equations* by B.L. Moiseiwitsch, Pitman Press, 1977

**VIII. ANY TECHNOLOGY THAT MAY BE USED:**

**IX. STUDENT ACADEMIC MISCONDUCT POLICY**

Maintaining high standards of academic integrity in every class at Tennessee Tech is critical to the reputation of Tennessee Tech, its students, alumni, and the employers of Tennessee Tech graduates. The Student Academic Misconduct Policy describes the definitions of academic misconduct and policies and procedures for addressing Academic Misconduct at Tennessee Tech. For details, view the Tennessee Tech's Policy 217 – Student Academic Misconduct at [Policy Central](#).

**X. DISABILITY ACCOMMODATION**

Students with a disability requiring accommodations should contact the Accessible Education Center (AEC). An Accommodation Request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The AEC is located in the Roaden University Center, Room 112; phone 931-372-6119. For details, view the Tennessee Tech's Policy 340 – [Services for Students with Disabilities at Policy Central](#).