

**NYU****ROBERT F. WAGNER GRADUATE  
SCHOOL OF PUBLIC SERVICE**

## **PADM-GP 2148**

# **Introduction to Structured Finance**

### **Instructor Information**

- Professor Laurence H. Wadler
- Email: [lh5@nyu.edu](mailto:lh5@nyu.edu)
- Phone: (201) 486-4242
- Office Address: NYU Zoom Room
- Office Hours: Monday 2:30pm-4:30pm and by appointment.
- Technical Workshops: Voluntary - to be coordinated during the semester.

### **Course Information**

- Class Meeting Times: Mondays 4:55pm – 6:35pm
- Class Location: 194 Mercer Street, Room 306B

### **Course Description**

We will study the process by which financing objectives are transformed into bond transactions and other opportunities to utilize structured finance products in the health and corporate finance sectors. The course will center on case studies of actual bond transactions that financed multiple new money (construction) and refunding projects as well as asset securitizations. We will learn the mathematics underlying financial structure and the governing conventions and vocabulary of structured finance. We will study the instruments of structured finance and how they manifest into structural form. Once we have developed this core understanding, we will review in detail the Official Statements and Offering Memorandums related to the case studies to begin our exploration of the structuring process.

All cash flow elements of the structuring process will be discussed in detail and formulated in EXCEL. Once a sufficient understanding of the purpose and protocols associated with the structuring process is developed, we will explore the bond structuring process using DBC Finance, the industry standard bond structuring software.

### **Course and Learning Objectives**

The primary objective of the course is to develop structured finance proficiency within and without DBC Finance which is a capability that is highly desired by both public and private

sector municipal market participants during this time of historic social and environmental financing need.

During the semester you will:

1. develop fixed income cash flow modeling capability relevant to the type of debt being issued by domestic and international public finance entities,
2. develop a fundamental understanding of the types of financing instruments used to create structural form,
3. develop a fundamental understanding of structural form and how it is shaped to achieve transactional objectives,
4. develop the ability to structure real world transactions using DBC Finance, the industry standard tool used to size and structure transactions, and
5. develop a functional understanding of how asset securitizations are sized and structured.

## . Learning Assessment Table

| Course Learning Objective Covered | Corresponding Assignment Title |
|-----------------------------------|--------------------------------|
| (1) , (2), & (3)                  | Homework Assignments           |
| (4) and (5)                       | Term Project and Final Project |

## Course Website

The course website resides on the NYU Classes system and is accessible via the “Academics” tab on NYU Home.

## Assignment and Grading

- Two homework assignments: 30%
- Term Project: 40%
- Take-home Final Project: 30%

For the Term Project you will size and structure a real world multi-purpose project finance transaction using DBC Finance. You can work from a standard set of specifications or I can customize your Term Project in accordance with your specific interests (for instance health care, housing, transportation, securitization, etc.).

## Required Readings

I have assigned chapters from the following works. All have been ordered at the NYU Bookstore and are also available in print and in digital format from Amazon.

- Securities Industry and Financial Markets Association (SIFMA), **Fundamentals of Municipal Bonds**, 6th Ed., Wiley, 2012.
- Frank J. Fabozzi, **Introduction to Fixed Income Analytics: Relative Value Analysis, Risk Measures and Valuation**, John Wiley & Sons. Inc.
- Edward R Tufte, **The Visual Display of Quantitative Information**, Graphics Press, Cheshire, Connecticut (Recommended but not required).

Additional readings of interest will be assigned on a weekly basis and made available on the Course Website.

## **Recommended Financial Calculator:** HP 12C

**Instructional Videos:** To augment and extend classroom discussion, I will be creating a library of videos. The description of the videos and supporting material will be organized in the Videos folder of our class site.

## **Academic Integrity**

Academic integrity is a vital component of Wagner and NYU. All students enrolled in this class are required to read and abide by [Wagner's Academic Code](#). All Wagner students have already read and signed the [Wagner Academic Oath](#). Plagiarism of any form will not be tolerated and students in this class are expected to report violations to me. If any student in this class is unsure about what is expected of you and how to abide by the academic code, you should consult with me.

## **Attendance**

I will not be keeping track of attendance but strongly encourage you to attend all classes in order that you can achieve a full and proper understanding of the course material.

## **Detailed Course Overview**

Class 1 – January 24

### **Introduction**

Topics:

- Syllabus Review
- Readings
- Overview of Course Objectives
- Discussion on the Nature of Finance (Finance as Convention)
- Financing Objectives: Project Finance  
Refunding/Refinancing
- Defining Structured Finance

Readings:

- Fundamentals, Chapter 2, The Basics of Municipal Securities
- Tufte, Part 1, Graphical Practice, Chapter 1. Graphical Excellence
- Fabozzi, Chapter 1, Time Value of Money

## Class 2 – January 31

### The Mathematics of Cash Flow

#### Topics:

- Discussion of importance of fundamental understanding
- Modeling in EXCEL: ○ Debt service ○ Accrual periods ○ Day-Count protocols ○ Compounding ○ Present and Future Value

#### Readings:

- Fundamentals, Chapter 1, Overview of the Municipal Bond Market, Introduction
- Fundamentals, The Rating Agencies
- Tufte, Part 1, Graphical Practice, Chapter 2. Graphical Integrity
- Fabozzi, Chapter 3, Day Count Conventions and Accrued Interest

## Class 3 – February 7

### The Instruments of Structured Finance

#### Topics:

- Define:
  - Fixed Rate Bonds ○
  - Variable Rate Bonds ○
  - Current Interest Bonds ○
  - Serial Bonds ○ Term Bonds ○
  - Capital Appreciation Bonds ○
  - Hybrids ○ Derivatives
- Discussion of Yield
- Bond Pricing in EXCEL ○ Premium Bonds ○ Discount Bonds

#### Homework #1 Distributed

#### Readings:

- Tufte, Part 1, Graphical Practice, Chapter 3, Sources of Graphical Integrity and Sophistication
- Fundamentals, The Issuers
- Fabozzi, Chapter 5, Yield Measures

## Class 4 – February 14

## Introduction to Financial Structure

### Topics:

- Define:
  - Dated date ◦ Delivery date ◦
  - First interest payment date ◦
  - First principal payment date ◦
  - Final principal payment date
- Introduction to Case Study
- Review of Case Study Official Statement

### Homework #1 Due

### Readings:

- Tufte, Part II, Theory of Data Graphics, Chapter 4, Data Ink and Graphical Redesign
- Fundamentals, Understanding Interest Rates
- Case Study Official Statement – Term Structure Section
- Fabozzi, Chapter 6, Analysis of Floating Rate Securities

## Class 5 – February 28

### Introduction to Project Finance Bond Sizing

### Topics:

- Discussion and Examples of Sizing Elements ◦ Project Fund ◦ Capitalized Interest Fund  
◦ Debt Service Reserve Fund ◦ Cost of Issuance Fund ◦ Revenue Fund

### Readings:

- Tufte, Part II, Theory of Data Graphics, Chapter 5, Chart Junk: Vibrations, Grids and Ducks
- Fundamentals, The Primary Market
- Case Study Official Statement – Sources and Uses Sections
- Fabozzi, Chapter 2, Yield Curve Analysis

## Class 6 – March 7

### Project Finance Cash Flow Modeling

### Topics:

- Sources and Uses Table
- Defining Net Funding and Gross Funding
- Modeling Project Finance Cash Flow Elements in Excel ◦ Net Funding of Project Fund  
◦ Net Funding of Capitalized Interest Fund ◦ Gross Funding of Debt Service Reserve  
Fund ◦ Constructing Sources and Uses Table

## Homework #2 Distributed

### Readings:

- Tufte, Part II, Theory of Data Graphics, Chapter 6, Data-Ink Maximization and Graphical Design
- Case Study Official Statement – Funding Flows sections
- Fabozzi, Chapter 4, Valuation of Option-Free Bonds

## Class 7 – March 21

### Introduction to Refunding/Restructuring Sizing

#### Topics:

- Define:
  - Escrow Requirements
  - Escrow Securities
  - Escrow Cash Flow
- Modeling Refunding Cash Flow Elements in EXCEL ◦ Escrow Requirements ◦ Escrow Portfolio Sizing ◦ Escrow Cash Flow ◦ Escrow Sufficiency ◦ Escrow Yield

#### Homework #2 Due

### Readings:

- Tufte, Part II, Theory of Data Graphics, Chapter 7 Multifunctioning Graphical Elements
- Fundamentals, Financial Products
- Refunding Case Study Official Statement - Plan of Finance Sections
- Fabozzi, Chapter 7, Valuation of Bonds with Embedded Options

## Class 8 – March 28

### Introduction to Structural Forms and Usage

#### Topics:

- Absolute Structural Forms ◦ Level Debt Service ◦ Level Principal
- Relative Structural Forms
  - Uniform
  - Accelerated
  - Deferred
  - Proportional
  - Fill

- Allocation of Case Study Aggregate Debt Service to Underlying Financing Purposes
- Discussion of Structural Forms and Financing Purpose

#### Readings:

- Tufte, Part II, Theory of Data Graphics, Chapter 8 Data Density and Small Multiples
- Fundamentals, Credit Analysis
- Refunding Case Study Official Statement – Sources and Uses/Debt Service sections
- Fabozzi, Chapter 16, Analysis of Interest Rate Swaps

## Class 9 – April 4

### Introduction to DBC Finance #1

#### Topics:

- Discussion of Objectives of the Structuring Process ○ Size the Transaction ○ Structure the Transaction
- Understanding the Inputs and Outputs of the Structuring Process
- DBC Finance: ○ Purpose ○ Architecture ○ Overview of Navigation
- Demonstrate Structuring of Case Study New Money Bonds. (Debt/Size Module)

#### Readings:

- Tufte, Part II, Theory of Data Graphics, Chapter 9 Aesthetics and Technique in Data Graphical Design, Epilogue: Designs for the Display of Information
- DBC Tutorial: Debt/Size
- Sample Issuer New Money Requests for Proposals
- Fabozzi, Chapter 12, Measuring Interest Rate Risk

## Class 10 – April 11

### Introduction to DBC Finance #2

#### Topics:

- Demonstrate Structuring of Case Study Refunding Bonds (Refund Module)

#### Readings:

- Fundamentals, Financial Products
- DBC Tutorial: Refund
- Sample Issuer Refunding Requests for Proposals
- Fabozzi, Chapter 15, The Tools of Relative Value Analysis

### Term Project Distributed

## Class 11 – April 18

## International Structured Finance

### Topics:

- Role of International Development Banks
- Challenges Associated with Project Financing in Emerging Markets
- Form and Structure of International Project Finance Transactions
- Challenges and Opportunities

## Introduction to Asset Securitization #1

### Topics:

- Sizing and Structuring Asset Securitizations ○ Discussion of Assets ○ Leveraging Process ○ Core Complexities
- Demonstration of Mortgage Back Security Structuring Part 1

### Readings:

- Sample Issuer Requests for Proposals for Complex Finance Plans
- Sample multi-financing purpose transaction Official Statement
- Fabozzi, Chapter 17, Estimating Yield Volatility

## Class 12 – April 25

- Guest Speaker:  
Mr. Patrick McCoy, Director of Finance  
Metropolitan Transportation Authority

### Readings:

- Fundamentals, The Secondary Market
- Fabozzi, Chapter 8, Cash Flow for Mortgage-Backed Securities and Amortizing Asset-Backed Securities

## Class 13 – May 2

### Introduction to Asset Securitization #2

### Topics:

- Demonstration of Mortgage Back Security Structuring Part 2
- Discussion of Other Asset Classes ○ Types
  - Core Differences/Similarities
  - Impact on Structuring Process

### Readings:

- Sample Collateralized Debt Obligation Offering Statement



- Fundamentals, Regulatory and Disclosure Requirements
- Fabozzi, Chapter 9, Valuation of Mortgage-Backed and Asset-Backed Securities

Final Project Distributed

## Class 14 – May 9

Review and Final Thoughts

Topics:

- Discussion of Final
- Review of Course Goals
- Reflections on the nature of finance and its impact on global prosperity
- Structured Finance as a Conscious Process
- Final Thoughts

Term Project Due

## Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the [Moses Center for Students with Disabilities \(CSD\) website](#) and click on the Reasonable Accommodations and How to Register tab or call or email CSD at (212-998-4980 or [mosescsd@nyu.edu](mailto:mosescsd@nyu.edu)) for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

## NYU's Calendar Policy on Religious Holidays

[NYU's Calendar Policy on Religious Holidays](#) states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.