1. Instrument Characteristics

- **Basic terms**: issuer, maturity, par (FV), coupon rate & frequency, day-count.
- **Coupon types**: fixed, floating ($Ref_t + Spread$), zero, step-up, deferred, PIK.
- **Seniority**: secured $\rightarrow$ senior unsecured $\rightarrow$ subordinated; covered bonds have dual recourse.
- **Legal**: indenture, covenants (affirmative/negative), cross-default, change-of-control.
- **Contingency provisions**: call, put, conversion, sinking fund, make-whole call.

2. Cash-Flow Structures

- **Level**: bullet (principal at N), fully amortising, balloon (partial amort).
- **Floating-rate note**: Coupon$_t = Ref_t + QM$; quoted margin vs required margin $\rightarrow$ discount/premium.
- **Indexed**: inflation (CPI)-linkers, TIPS — principal indexed, coupon on adj. principal.
- **Dual currency**: coupons in one, principal in another; FX risk.

3. Issuance, Trading, Settlement

- **Primary**: underwritten vs best-effort; auction (uniform vs discriminatory); shelf registration (Rule 415).
- **Secondary**: OTC quote-driven; bid-ask $\rightarrow$ liquidity cost.
- **Settlement**: T+2 corporates, T+1 Treasuries; cash vs delivery-versus-payment.
- **Price quotation**:
- **Day-count**: 30/360 (corp), Act/Act (govt), Act/360 (money market).

4. Bond Pricing & Accrued Interest

- **Full price**: $P_{full} = \sum_{t=1}^{N} \dfrac{CF_t}{(1+r)^t}$.
- Accrued $= \dfrac{Days_{sett}}{Days_{period}} \times Coupon$; $Clean$=Full$-$Accrued.
- **Yield–price relationship**: convex, inversely related; price elasticity $\propto$ duration.
- **Matrix pricing**: derive YTM via interpolation of comparable bonds.
- **Bootstrapping**: solve for spot z_t sequentially using coupon bonds.

5. Yield Metrics & Spreads

- **Current yield**: $CY = \dfrac{Coupon}{P_{clean}}$ (ignores capital gain).
- Yield-to-maturity (Street vs true), Yield-to-first-call, Yield-to-worse.
- **Money-market**: discount yield $r_d = \dfrac{FV - P}{FV}\dfrac{360}{t}$; add-on $r_{add} = \dfrac{FV - P}{P}\dfrac{360}{t}$; BEY $\approx r_{add}\dfrac{365}{360}$.
- **Par vs spot vs forward curves**; derive forward: $(1+z_A)^A(1+f_{A,B})^{B-A} = (1+z_B)^B$.
- **Spreads**: nominal (vs on-the-run), G-spread (govt), I-spread (swap), Z-spread (zero-vol), OAS = Z $-$ option cost, swap spread = swap – govt.
- Yield ratio (Muni/UST) gauges tax benefit.

6. Duration, DV01 & Convexity

- Macaulay $Mac = \sum t\,PV(CF_t)/P$; Modified $Mod = \dfrac{Mac}{1 + y/m}$.
- $\%\Delta P \approx -Mod\,\Delta y$; DV01 $= 0.0001 \times Mod \times P$.
- Effective duration uses scenario prices $D_{eff} = \dfrac{P_- - P_+}{2P_0\Delta y}$ for optioned bonds.
- **Key-rate dur**: isolate sensitivity at 2y,5y,10y…; bucket curve shifts.
- **Convexity** $C = \dfrac{P_- + P_+ - 2P_0}{P_0(\Delta y)^2}$; $\%\,\Delta P \approx -D\,\Delta y + \frac{1}{2}C\,(\Delta y)^2$.

7. Embedded Options

- Price$_{callable}$ = $Price_{option\text{-}free} - Call_{option}$ $\rightarrow$ negative convexity near call price.
- Price$_{putable}$ = $P_{option\text{-}free} + Put_{option}$ $\rightarrow$ floored downside.
- Effective duration/convexity lower (call) or higher (put) than option-free.
- **Yield measures**: Yield-to-call, yield-to-put; OAS adjusts Z for option cost (binomial or Monte Carlo).

8. Term-Structure Theories & Strategies

- Expectations (pure), Liquidity premium (preferred habitat), Market segmentation.
- **Strategies**: bullet vs barbell vs ladder; riding the yield curve; carry-roll-down.
- **Immunisation**: match Macaulay duration to horizon, PV of assets = PV of liabilities; requires rebalancing if yields shift.

9. Credit Risk Analysis

- Expected loss = $PD \times LGD$, credit VaR considers exposure.
- **Ratios**: leverage (D/EBITDA), interest coverage (EBIT/Int), FFO/debt.
- Structural vs reduced-form models; credit migration—transition matrices.
- **Bond spread decomposition**: default risk, liquidity, tax, option, issuance.

10. Securitised Products

- **MBS**: pass-through, PSA prepayment benchmark (100 PSA = 2% CPR in 30th month).
- Average life shorter/longer under contraction/extension; negative convexity.
- **CMO**: PAC tranche (stable CF), support tranche (absorbs prepay variability).
- ABS structures: credit card, auto — amortising vs bullet pay; credit enhancements (subordination, reserve account).

11. Repo & Funding Markets

- Classic repo: sell security, agree to repurchase; reverse repo = other side.
- Repo rate drivers: collateral quality, term, collateral availability, delivery option, Fed policy.
- **Haircut** $= 1 - \dfrac{PP}{MV}$; variation margin resets collateral value.
- **Bank discount yield**: r_d; Bond-equivalent yield converts MM to bond basis.

12. Performance Attribution & TR Analysis

- **Total return** = Price return + Coupon + Re-investment; horizon return uses projected yield curve.
- Attribution buckets: yield-curve effect, spread effect, selection (issuer), currency (intl).
- Tracking risk measured vs benchmark (index) using ex-post tracking error.