1. Portfolio Management Process

- **3 steps**: *Planning* (IPS) $\rightarrow$ *Execution* (asset allocation, security selection) $\rightarrow$ *Feedback* (monitor, rebalance, performance eval).
- **Investment Policy Statement (IPS)**: objectives (risk, return), constraints (liquidity, time horizon, taxes, legal, unique), benchmark, duties.
- **Strategic asset allocation (SAA)**: long-term weights; **Tactical AA** deviates short-term for opportunities.
- **Risk budgeting**: allocate total risk across SAA, TAA, selection.

2. Risk & Return Fundamentals

- Holding-period return $R = \dfrac{P_1 - P_0 + D}{P_0}$; arithmetic vs geometric mean; variance, SD, CV.
- **Utility**: $U = E(R) - \frac{1}{2}A\sigma^2$; higher indifference curves $\rightarrow$ higher utility.
- **Risk types**: systematic vs unsystematic; total $\sigma^2 = \beta^2\sigma_M^2 + \sigma_e^2$.

3. Modern Portfolio Theory

- Two-asset $E(R_p) = w_1E(R_1) + w_2E(R_2)$; $\sigma_p^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho\sigma_1\sigma_2$.
- **Minimum-variance frontier**, global MV, efficient frontier (MV + max return).
- **Capital Allocation Line (CAL)**: $E(R_c) = R_f + \frac{E(R_P)-R_f}{\sigma_P}\sigma_c$; slope = Sharpe.
- Two-fund separation: risky portfolio P same for all, combine with R_f per risk tolerance.

4. Capital Market Theory

- **Capital Market Line (CML)**: CAL where P = market portfolio M; only efficient portfolios lie on CML.
- **Security Market Line (SML)**: any asset $E(R_i) = R_f + \beta_i[E(R_M) - R_f]$.
- **Beta**: $\beta_i = \dfrac{Cov(R_i, R_M)}{\sigma_M^2}$; portfolio $\beta = \sum w_i\beta_i$.
- **CAPM assumptions**: homogeneous expectations, frictionless, single-period, divisible, price takers, risk-averse utility.

5. Multifactor & APT Models

- APT: $E(R_i) = R_f + \sum_k \beta_{ik}\lambda_k$ (no-arbitrage).
- Fama-French 3-factor: MKT, SMB (size), HML (value); Carhart adds momentum (UMD).
- Macro factor model example: GDP, inflation, yield-curve, credit spread, liquidity.

6. Performance Evaluation

- **Sharpe** $= (R_P - R_f)/\sigma_P$ (total risk).
- **Treynor** $= (R_P - R_f)/\beta_P$ (systematic risk).
- **M^2**: makes Sharpe in
- **Jensen's Alpha** $= R_P - [R_f + \beta_P(R_M - R_f)]$.
- Information ratio $= \alpha/\sigma_e$ (active return vs active risk).

7. Investor Types & Constraints

- Individuals, DB/DC pensions, banks, insurance (life vs P&C), endowments, foundations, sovereign wealth.
- Table: *Time horizon, risk tolerance, income need, liquidity need.* (See curriculum).
- Constraints: liquidity, horizon, taxes, regs, legal, ESG, unique.

8. Behavioral Finance

- Cognitive errors: conservatism, confirmation, anchoring, availability, illusion of control, hindsight.
- Emotional biases: loss aversion, overconfidence, status quo, endowment, self-control, regret.
- Market phenomena: momentum, bubbles, value vs growth anomaly.

9. Risk Management Framework

- **Risk governance**: board defines appetite, tolerance, policy.
- **Process**: identify $\rightarrow$ measure $\rightarrow$ modify (avoid, accept, transfer, shift) $\rightarrow$ monitor.
- **Enterprise Risk Management**: aggregate across market, credit, liquidity, operational, legal.

10. Risk Metrics & Tools

- Standard Deviation, Semivariance, Value at Risk (Parametric, Historical, Monte Carlo), Conditional VaR (CVaR), Stress Testing & Scenario Analysis.
- Duration, DV01, Convexity, Greeks (Δ, Γ, Vega, Rho), Beta.
- Risk-Adjusted Return on Capital (RAROC), Economic Capital.

11. Portfolio Construction & Rebalancing

- **Optimization**: mean-variance, Black-Litterman (reverse optimise & blend with views).
- **Rebalancing**: calendar vs corridor; tradeoff txn cost vs drift; CPPI vs constant mix.
- **Allocation approaches**: core-satellite, risk parity, liability-driven, smart beta.

12. Asset Management Industry & Trends

- Active vs. Passive; Traditional vs. Alternative; Smart Beta; Fee Compression.
- Robo-Advisors, Big Data & AI in Investment, ESG Integration.
- Mutual Funds, ETFs, SMAs, Hedge Funds, Private Equity, Venture Capital; Ownership & Revenue Models.