Group Project Brief

BSc Seminar: Digital Finance

[Instructor Name]University Name¿University Name

Semester: [Term Year] • Due: [Date]

1 Overview

This group project is a core component of the BSc Digital Finance seminar. You will work in teams to explore one topic in depth, combining explanation, data, and original analysis.

- **Team size:** 3–4 students. Form teams by Day 2 of the seminar; the instructor confirms all teams.
- **Deliverables:**
  1. A 10-minute group presentation (plus 5 minutes Q&A).
  2. A 5-page written report (excluding references and appendix).
- **Due date:** 2 weeks after seminar completion. Submit the report as PDF via the course platform; present during the final session.

2 Topic Options

Choose **one** of the following five topics. Each team must select a different topic; assignments are first-come, first-served.

2.1 Topic 1: Compare Three AMM Designs

Choose three automated market makers (e.g., Uniswap V2, Uniswap V3, Curve). For each AMM:

- Explain how it works, including the core mathematical formula (e.g., $x \cdot y = k$ for constant-product AMMs).
- Describe the fee structure and how liquidity providers earn returns.

Then compare the three designs along these dimensions: capital efficiency, impermanent loss exposure, and fee structure. Conclude with a discussion of which design is best suited for which use case (e.g., stablecoin pairs vs. volatile pairs).

2.2 Topic 2: Backtest a Simple Crypto Trading Strategy

Implement a momentum or mean-reversion trading strategy for BTC or ETH using daily price data (at least 2 years). Your report should:

- Define the strategy rules precisely (entry, exit, position sizing).
- Measure performance: cumulative returns, annualized Sharpe ratio, and maximum drawdown.
- Compare to a buy-and-hold benchmark over the same period.
- Discuss limitations: transaction costs, slippage, data-snooping bias, and out-of-sample validity.

Include at least one equity-curve chart and one table of summary statistics.

2.3 Topic 3: Analyze a DeFi Protocol's Risk Parameters

Choose one lending protocol: Aave, Compound, or MakerDAO. Examine:

- Collateral ratios and liquidation thresholds for at least 3 assets.
- The interest rate model (how borrowing/lending rates adjust with utilization).
- Historical liquidation events: how many, how large, and what triggered them.

Propose at least two specific improvements to the protocol's risk parameters and justify them with data or reasoning.

2.4 Topic 4: Design a CBDC for a Developing Country

Choose a specific developing country. Design a central bank digital currency by addressing:

- Wholesale vs. retail CBDC: which model and why.
- Technology choices: blockchain-based vs. centralized ledger; account-based vs. token-based.
- Monetary policy implications: impact on commercial banks, disintermediation risk, interest-bearing vs. non-interest-bearing.
- Financial inclusion: how the CBDC reaches unbanked populations (offline capability, mobile access).
- Privacy and security trade-offs.

2.5 Topic 5: Investigate a Crypto Fraud or Hack Case Study

Choose one event: the FTX collapse, Terra/Luna failure, the DAO hack (2016), Celsius bankruptcy, or OneCoin fraud. Your case study should cover:

- **What happened:** timeline of events, key actors, amounts involved.
- **Why it happened:** structural vulnerabilities, governance failures, or fraudulent intent.

- **Who was harmed:** investors, users, counterparties; estimate total losses where possible.
- **Regulatory response:** what regulatory changes followed (e.g., MiCA, SEC enforcement actions) and whether they address the root cause.

3 Grading Rubric

The project is graded out of 100 points. Presentation and report are evaluated jointly.

Criterion	Points	Description
Clarity of explanation	25	Is the presentation and report clear and well-structured? Are visuals effective? Can a non-specialist follow the argument?
Technical accuracy	25	Are facts, definitions, and mathematical formulas correct? Are claims properly supported with citations?
Evidence and data	25	Does the project use real data, charts, tables, and specific examples? Are sources credible and clearly referenced?
Originality	25	Does the project go beyond summarizing existing material? Is there independent analysis, a novel comparison, or concrete recommendations?

4 Presentation Guidelines

- **Duration:** 10 minutes presentation + 5 minutes Q&A. Time limits are strictly enforced.
- **Participation:** All team members must present at least one section. Grading is individual as well as collective; a team member who does not present receives a penalty.
- **Format:** Use slides (PowerPoint, Keynote, LaTeX Beamer, or Google Slides). Submit the slide deck as PDF together with the report.
- **Visuals:** Include at least 2 data visualizations (charts, diagrams, or tables with real data). Avoid walls of text on slides.
- **Q&A:** Be prepared to answer questions on methodology, data sources, and assumptions. The audience and instructor will ask questions; thoughtful answers contribute to the clarity score.

5 Report Guidelines

- **Length:** 5 pages maximum, excluding references and any appendix. Submissions exceeding 5 pages will be penalized.
- **Formatting:** 12pt font, 1.5 line spacing, margins of at least 2.5 cm.
- **Executive summary:** Begin with a 150-word executive summary that states the topic, approach, and key findings.
- **References:** Minimum 5 references. Use the course bibliography (`references-bsc.bib`) as a starting point; additional sources are encouraged.
- **Citation style:** Author-year format (e.g., "Harvey et al., 2021" or "Nakamoto, 2008"). Use a consistent style throughout.
- **Appendix (optional):** Code, additional tables, or extended derivations may be placed in an appendix. The appendix does not count toward the page limit but will not be the primary basis for grading.

Academic integrity: All work must be original. Cite all sources. The university's policy on plagiarism applies in full. Use of AI-assisted writing tools must be disclosed in a footnote on the first page.