# Capstone — Integrated Immunoinformatics Project — Hands-on

Consolidate everything learned across immunoinformatics, vaccinology and host–pathogen analytics into one guided capstone. You will scope a realistic project, organise datasets conceptually, design an analysis storyline, interpret epitope and immuno-analytics outputs with safety and population coverage in mind, and assemble a concise translational brief for scientific and non-technical stakeholders.

## Capstone — Integrated Immunoinformatics Project

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**Session Index**



**Session 1**

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### Project Scoping & Dataset Intake

Selecting a realistic immunoinformatics challenge (conceptual)

**pathogen vaccine concept, tumour neoantigen idea or repertoire story** **defining a clear primary question in plain language** **identifying stakeholders and intended decisions**

Dataset intake and sanity checking at a high level (no raw QC)

cataloguing sequence, expression or repertoire style inputs noting HLA, clinical and meta information availability flagging gaps, caveats and simplifying assumptions early

Outcome and deliverable planning before running analyses

deciding on tables, figures and summary views needed linking each planned output to a stakeholder question setting scope boundaries for the capstone project

Session 2

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## Workflow Storyboard & Dry Runs

Storyboarding the end-to-end analysis pipeline (conceptual view)

epitope, HLA coverage, repertoire or neoantigen stages in sequence where host–pathogen networks or immunopeptidomics plug in simple flow diagrams tying modules from this category together

Dry run analyses and spot checking logic (no heavy computation in class)

testing a small subset of antigens or samples conceptually checking that intermediate outputs answer the right sub-questions refining or trimming steps to keep the project realistic

Tracking decisions, assumptions and versioning by habit

simple change log for data and pipeline choices noting why certain branches were dropped or prioritised preparing for transparent explanation in the final brief

Session 3

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## Interpretation, Risk & Recommendations

Reading epitope, coverage and repertoire style outputs as stories

**which candidate features look promising conceptually** **how population coverage or HLA spread shapes conclusions** **connecting patterns to vaccine, antibody or monitoring ideas**

Safety, cross-reactivity and regulatory awareness in interpretation

**applying autoimmunity and mimicry concepts as filters** **noting data gaps that prevent strong safety statements** **tying results to regulatory and risk management modules conceptually**

Drafting actionable yet realistic recommendations for next steps

**prioritised shortlists of candidates or signatures (conceptual)** **suggested experiments or data additions at a high level** **clear separation of evidence based points versus hypotheses**

**Session 4**
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## Final Presentation & Dossier Packaging

Structuring a short, high impact slide deck for stakeholders

**problem statement, approach and key findings in 1–2 slides each** **simple visuals for epitopes, coverage and risk flags** **clear take home messages and next steps bullets**

Assembling a concise written dossier for scientific records

**one page summary plus a few pages of structured detail** **tables capturing candidate lists and key metrics conceptually** **explicit documentation of**

assumptions and limitations

Reflection, feedback and personal learning roadmap

what worked well in problem framing and communication areas to deepen skills in future (analysis, biology or communication) linking the capstone to CV, portfolio and interview narratives