

PROJECT TITLES

All projects are 15 credits

1. **The Sylow Theorems.**

This project will investigate the proofs of the three Sylow Theorems (including an alternative proof to that provided in the Group Theory module of the First theorem). It will also look at applications of the theorems.

2. **The structure of \mathbb{Z}_n^\times .**

This project will examine the cyclicity of \mathbb{Z}_p^\times and expand on that result to start to investigate the structure of \mathbb{Z}_n^\times .

3. **Group Characters**

A group character is a homomorphism $\chi : G \rightarrow C^\times$. It turns out that for any given group, the set of all such characters forms a group itself under the operation of pointwise multiplication and we denote this as \hat{G} . The ultimate aim of the project is to prove that $\hat{\hat{G}} \cong G$.

4. **A Brief History of Geometry**

This project will start with a study of Euclid's 'Elements' before moving on to study other types of geometry. Examples of non-Euclidean geometries are geometry on a sphere, projective geometry, and geometry in the hyperbolic plane. This project is more discursive than analytical.

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