

Preliminary Course on Mathematics – winter term 2014/2015

Syllabus

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Christian-Albrechts-Universität zu Kiel

Wirtschafts- und
Sozialwissenschaftliche Fakultät

Part 1 – Linear algebra

- **Vector and matrix algebra**

- Scalar product
- Special matrices
- Determinant
- Matrix inverse

- **Systems of equations**

- Linear combinations
- Basis and rank
- Nonlinear equations

- **Eigenvalue problems**

- Linear transformations
- Eigenvalues

Part 2 – Calculus

- **Differential calculus**

- Necessity and sufficiency
- Differentiation rules
- Partial derivative

- **Optimization**

- Maximum and minimum
- Optimization with constraints
- Lagrange multipliers
- Kuhn-Tucker conditions

- **Approximation**

- Total differential
- Taylor series

- **Integral calculus**

- Definite integral
- Integration by parts
- Substitution formula