

# MZUZU UNIVERSITY

FACULTY OF EDUCATION

DEPARTMENT OF MATHEMATICS

## SYLLABUS

1. **Programme** : Master of Science
2. **Subject** : Mathematics
3. **Course Title** : Error Correcting Codes 2
4. **Course Code** : MSC 5A02
5. **Prerequisites** : MSC 5901
6. **Level of Study** : Five
7. **Duration** : 14 weeks
8. **Lecture Hours per week** : Two
9. **Tutorials/Seminars per week** : One
10. **Assessment** : Examination
11. **Aim(s) of the Course** : Building on Error Correcting Codes 1 to introduce some of the more common classes of codes and study in detail their properties.
11. **Objectives of the Course** : By the end of course the student should be able to define all the terms below, prove any results and discuss their significance.
12. **Topics of the course:** Cyclic codes, Reed Solomon codes, Generalized Reed Solomon codes, Alternant codes, Goppa codes, polynomial codes, BCH codes, Quadratic Residue codes, LDPC codes, convolutional codes, automorphism group of a code, Idempotents of a cyclic code. Use of Maple Programming Use of Magma Programming
13. **Prescribed Texts:** Notes on Coding Theory by J. Hall  
Department of Mathematics,  
Michigan State, USA.

Coding Theory, A first Course  
San Ling and Chaoping Xing  
Cambridge University Press 2004  
ISBN 0-521-52923-9

14. **Recommended Texts:**

- [1] Introduction to Coding and Information Theory, by  
Steven Roman  
Springer-Verlag 1997
- [2] The Theory of Error Correcting Codes, by  
F J MacWilliams and N J A Sloane  
Elsevier Science B.V. 1977  
ISBN 0-444-85193-3
- [3] Introduction to Coding Theory, by  
J H van Lint  
Springer-Verlag 1992  
ISBN 0-387-54894-7  
ISBN 3-540-54894-7 (Berlin)
- [4] A First Course in Coding Theory, by  
Raymond Hill  
Clarendon Press, Oxford, 1986  
ISBN
- [5] Error-Correcting Codes and Finite Fields, by  
Oliver Pretzel  
Clarendon Press, 1992  
ISBN 0-19-269067-1
- [6] Error Correcting Codes, a first course, by  
Henk van Tilborg  
Chartwell Brat, 1993  
ISBN 0-86238-338-2
- [7] Elements of Algebraic Coding Theory  
Lekh R. Vermani  
Chapman and Hall, London, 1996  
ISBN 0-412-57380-6
- [8] Maple 5 Learning Guide  
by K.M. Heal, M.L. Hansen and K.M. Rickard  
Waterloo Maple
- [9] Maple 6 Learning Guide  
by K.M. Heal, M.L. Hansen and K.M. Rickard

Waterloo Maple  
ISBN 1-894511-00-X

- [10] Maple 5 Programming Guide  
by M.B. Monagan, K.O. Geddes, K.M. Heal  
S.M. Vorkoetter and G. Labahn.  
Waterloo Maple
- [11] On-line manual of the Maple software
- [12] On-line manual of the Magma software.