Math 810   Error-Correcting Codes

Spring 2015
MWF 9:10–10:00
C304 Wells Hall

J. Hall   Office hours:
D219 Wells Hall   MWF 10:20-11:10
x34653   or by arrangement
jhall@math.msu.edu

There has been various conflicting information about our schedule and classroom this semester. We will meet:

MWF 9:10-10:00 in C304 Wells Hall. First class: Friday, January 16.

There is no text for the course, but class notes (which include much of the material) are available on my web page:

`http://www.math.msu.edu/~jhall/classes/classes.html`

Grading:

- homework (roughly 70-80%)

- and a final exam (roughly 30-20%);

- the lecturer may decided to replace part of the homework or final by a project (or projects).

The course is designed for students in technical disciplines (mathematical sciences, physical sciences, engineering, etc.) who have basic knowledge of linear algebra. The more advanced algebra of finite fields and polynomial rings that is necessary will be provided or developed in class.

The course begins by introducing the basics of algebraic coding theory before moving on to specific topics of broad interest. This will include generalizations of Reed-Solomon codes with a decoding algorithm based on the Euclidean algorithm and codes with decoding algorithms based on graphs.

The selection of additional material and of possible projects will depend upon the make-up of the class and the time available.

Right now I am scheduled to miss class on Monday, January 12 and Wednesday, January 24. Class will not meet on the days I am away.

Some important dates this semester:
Monday, 01/12/2015: Classes begin. **No class.**
Tuesday, 01/14/2015: **No class.**
Friday, 01/16/2015: Online open add period ends at 8pm.
Monday, 01/19/2015: Martin Luther King, Jr., Day. No classes held; university is open.
Friday, 02/06/2015: End of 100% Tuition Refund.
Monday 03/09/2015 to Friday 03/13/2015: Spring Break.
Friday, 05/01/2015: Last day of classes.
Tuesday, 05/05/2015, 7:45-9:45am: Final Exam.

Books on Reserve in Math Library for Math 810

General References

QA268 .B48 2004
J. Bierbrauer, "Introduction to coding theory," Chapman and Hall/CRC, 2005.
ISBN 1584884215

QA268 .B54 1983
R.E. Blahut, "Theory and practice of error control codes," Addison-Wesley, 1983. ISBN 0201101025

QA268 .L57 1999
J.H. van Lint, "Introduction to coding theory," 3rd edition, Graduate Texts in Mathematics **86**, Springer, 1999. ISBN 3540641335

Q360 .M25 2002
R.J. McEliece, "Theory of information and coding, Second Edition" Encyclopedia of Mathematics and its Applications, Cambridge University Press, 2002. ISBN 0521000955

QA268 .H84 2003
V.S. Pless, W.C. Huffman, "Fundamentals of error-correcting codes," Cambridge University Press, 2003. ISBN 0521782805

TK5102.92 .R68 2006
R.M. Roth, "Introduction to coding theory," Cambridge University Press, 2006.
ISBN 0521845041, ISBN/ISSN 9780521845045

QA268 .M3 pt.1/2
F.J. MacWilliams and N.J.A. Sloane, "Theory of error-correcting codes," parts 1/2, North-Holland, 1977. ISBN 0444850090, ISBN 0444850104

Introductory Books

QA268 .H55 1986
R. Hill, "A first course in coding theory," Oxford University Press, 1986.
ISBN 0198538049

QA3 .L28 no. 201
J.H. van Lint, "Coding theory," Lecture Notes in Mathematics **201**, Springer-Verlag, 1971. ISBN 3540054766

QA268 .P55 1998
V. Pless, "Introduction to the theory of error-correcting codes," 3rd edition, Wiley, 1998. ISBN 0471190470

QA268 .P74 1992
O. Pretzel, "Error-correcting codes and finite fields," Oxford University Press, 1992. ISBN 0198596782

MSU Electronic Resource

QA268 .B496 2008
N.L. Biggs, "An introduction to information communication and cryptography," Springer, 2008. ISBN 9781848002722, 1848002726