Module Description of Coding theory

Module Name	:	Coding theory
Module Level	:	Bachelor
Code, if applicable	:	23H01121703
Subtitle, if applicable	:	-
Courses, if applicable	:	Coding theory
Semester(s) in which the module is taught	:	4 (Fourth Semester)
Module coordinator(s)	:	Dr. Muhammad Zakir, M.Si
Lecturer(s)	:	Dr. Muhammad Zakir, M.Si., Prof. Dr. Nurdin, S.Si., M.Si.
Language	:	Bahasa (Indonesian language)
Relation to curriculum	:	Elective course in second year for Bachelor degree in Mathematics
Type of teaching/teaching method	:	Lecturing, Small Group Discussion, Collaborative Learning, Self-Directed Learning
Contact hours	:	150 minutes lectures per week, 180 minutes structured activities per week, and 180 minutes independent study per week
Workload	:	Total workload is 135 hours per semester which consists of 40 hours per semester for Learning and Teaching, 47.5 hours per semester for Self-Study, and 47.5 hours per semester for Structured Works
Credit points	:	3 (4.8 ECTS)
Requirements according to the examination regulations	:	Students are required to attend at least 80% of the total meetings which is recorded via the attendance menu at https://sikola-v2.unhas.ac.id/, complete all mandatory assignments, and obtain permission from the lecturer to participate in the writtenexamination.
Recommended prerequisites	:	Students have completed and taken the exams for Mathematical Logic and Set, Linear Algebra I, Discrete Mathematics, Algebra Structure
Module objectives/intended learning outcomes	:	After the completion of this module, the student will be able to: CLO 1. decode, detect, and correct errors; CLO 2. perform decoding of linear codes; CLO 3. decode perfect codes; CLO 4. construct polynomials from a cyclic code, The following is the mapping of the ILO and the CLO of this course:

	ILO 1	ILO 2	ILO 3
CLO 1	X		
CLO 2		X	
CLO 3			X
CLO 4			X

<table>
<tr><td>Content</td><td>:</td><td>Coding Theory is an application of Linear Algebra. Several fundamental concepts that must be mastered in this course are related to Linear Algebra, particularly the concept of vector spaces and their properties. Specifically, the vector spaces that are extensively discussed in this course are matrix spaces. The topics covered in this course include linear codes, perfect codes, and other related types of codes, as well as cyclic codes.</td></tr>
<tr><td>Study and examination requirements</td><td>:</td><td>Study and examination requirements:
Students must attend 15 minutes before the class starts.
Students must switch off all electronic devices.
Students must inform the lecturer if they will not attend the class due to sickness, etc.
Students must submit all class assignments before the deadline.
Students must attend the exam to get final grade.</td></tr>
<tr><td>Exams and assessment formats</td><td>:</td><td>Participants are marked based on their performance in theory: Assignment and Quizzes (60%), Written Exam (40%)

Assignments assess student's ability to apply concepts independently. Quizzes are used to test continuous understanding of weekly content. The Written Exam assesses comprehension and synthesis of all materials discussed during the semester. Altogether, these components account for 100% of the final grade.

Students are marked based on their percentage of points obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>85 – 100</td><td>A</td><td>4.00</td></tr>
<tr><td>80 - <85</td><td>A-</td><td>3.75</td></tr>
<tr><td>75 - < 80</td><td>B+</td><td>3.5</td></tr>
<tr><td>70 - < 75</td><td>B</td><td>3.0</td></tr>
<tr><td>65 - < 70</td><td>B-</td><td>2.75</td></tr>
<tr><td>60 - < 65</td><td>C+</td><td>2.5</td></tr>
<tr><td>50 - < 60</td><td>C</td><td>2.00</td></tr>
<tr><td>40 - < 50</td><td>D</td><td>1.00</td></tr>
<tr><td>< 40</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Reading list</td><td>:</td><td>Main:
Coding Theory A First Course; SAN LING CHAOPINGXING; National University of Singapore; 2004
Coding Theory and Cripthography: The Essential, second edition, D.R. Hankerson, D.G. Hoffman, D.A. Leonard, C.C. Lindner, K.T. Phelps, C.A. Rodger, J.R. Wall, Marsel Dekker Ink, New York, 2000</td></tr>
</table>

		3. Introduction to Coding Theory, J.H. Van Lint, Springer-Verlag, 1982. Additional: 1. Coding Theory and Cripthography: The Essential, second edition, D.R. Hankerson, D.G. Hoffman, D.A. Leonard, C.C. Lindner, K.T. Phelps, C.A. Rodger, J.R. Wall, Marsel Dekker Ink, New York, 2000 2. Theory of Error-Correcting Codes, F.J. Mac Williams, J.J. Sloane, North-Holland, 1977. 3. Introduction to The Theory of Error-Correcting Codes, V. Pless, Wiley, 1982. 4. A Mathematical Theory of Communication, C.E. Shannon, Bell System Technical Journal, 27:379-423, and 623-56, 1948.
Last revision date	:	February 5th, 2025