Module Description/Course Syllabi

Study Programme: Bachelor of Mathematics
Faculty of Mathematics and Natural Sciences
Universitas Andalas

1. *Course number and name*

MAT61225 Introduction to Fourier Analysis

2. *Credits and contact hours/Number of ECTS credits allocated*

3 sks / 4,53 ECTS

3. *Instructors and course coordinator*

Dr. Shelvi Ekariani

4. *Textbook, title, author, and year*

G. B. Folland. (1992). *Fourier Analysis and Its Applications*. Wadsworth & Brooks/Cole, Pacific Grove Ca.

5. *Recommended reading and other learning resources/tools*

E. M. Stein and R. Shakarci. (2003). *Fourier Analysis: An Introduction*. Princeton Univ. Press, New Jersey

6. *Specific course information*

A. Brief description of the content of the course (catalog description)

The theme of this course is the analysis and synthesis of functions or signals. The emphasis in the course is more on the theoretical aspects, but participants will have the opportunity to learn about various applications. Understanding the concepts of limit of sequences and continuity of functions is a prerequisite for this course.

B. Prerequisites or co-requisites
Real Analysis 2
C. Indicate whether a required or elective course in the program
Required
D. Level of course unit (according to EQF: first cycle Bachelor, second cycle Master)
First Cycle Bachelor
E. Year of study when the course unit is delivered (if applicable)
4 Year
F. Semester when the course unit is delivered
Odd Semester
G. Mode of delivery (face-to-face, distance learning)
Face to face

7. *Intended Learning Outcomes*
ILO-2: Possesses profound knowledge of the basic concept of mathematics. PI-1: Able to explain the basic concepts of mathematics. PI-2: Able to provide examples that are relevant to the basic concepts of mathematics. PI-3: Able to determine simple problem solutions using basic mathematical concepts.

ILO-3: An ability to identify, explain and generalize simple mathematics. PI-1: Able to identify simple math problems. PI-2: Be able to explain simple math problems.
ILO-4: An ability to use concepts and fundamental techniques of mathematics in solving simple mathematical problems. PI-1: Able to choose the right basic mathematical concepts and techniques in solving simple math problems. PI-2: Able to illustrate simple mathematical problems based on appropriate basic mathematical concepts and techniques.
ILO 5: An ability to formally and correctly prove simple mathematical statements using facts and methods that have been studied. PI-1: Be able to identify formal structures and forms of analogy in mathematics; PI-2: Able to use facts and apply methods in proving simple mathematical statements. PI-3: Able to present a rigorous proof of simple mathematical statements (with a trace and thorough).
ILO-9: An ability to apply knowledge of mathematics in career and involve in lifelong learning PI-1: Able to carry out learning independently to deepen and expand the knowledge that has been obtained
8. *Course Learning Outcomes*
1. Ability to mastery the basic concepts of fourier analysis, as well as their related properties. (**ILO-2**: PI-1, PI-2, PI-3)
2. Ability to apply the basic properties learned to solve problems related to the course material. (**ILO-4**: PI-1, PI-2, PI-3)
3. Ability to generalizing problems related to the subject matter of this course. (**ILO-3**: PI-1, PI-2, PI-3)
4. Ability to identifying the formal structure of statements related to the course material and their analogous forms. (**ILO-5**: PI-1-4)

5. Ability to mastery of fundamental techniques necessary for problem-solving within the scope of this course material. (**ILO-4**: PI-1, PI-2, PI-3)

6. Ability to independently solve problems related to the fourier analysis. (**ILO-9**: PI-1)

9. *Brief list of topics to be covered*

Some classic partial differential equations, classic Fourier series, generalized Fourier series in the space $L^2(D)$, their usage in boundary value problems, Fourier transforms, the inverse Fourier theorem, and their application in partial differential equations.

10. Learning and teaching methods

Directed Learning, Teacher Center Learning

11. Language of instruction

Bahasa and English

12. Assessment methods and criteria

Summative Assessment:
1. Mid-term exam: 35%
2. Final exam: 35%
3. Quizzes: 20%
4. Homework: 10%

Formative Assessment: