	Module Description/Course Syllabi
	Study Programme: Bachelor of Mathematics Faculty of Mathematics and Natural Sciences Universitas Andalas

1. *Course number and name*

MAT61247 Capita Selecta on Applied Mathematics 2

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

3 sks / 4,53 ECTS

3. *Instructors and course coordinator*

1. Prof. Dr. Muhafzan; 2. Dr. Noverina Alfiany

4. *Text book, title, author, and year*

1. C. Milici, G. Draganescu, J. T. Machado, Introduction to Fractional Differential Equations, Springer, 2019
2. I. Podlubny, Fractional Differential Equations, Academic Press, 1999

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

Kilbas, A. Y., Srivastava, H. M. and Trujillo, J. J., Theory and Applications of Fractional Differential Equations, Elsevier, North Holland, 2006.

6. *Specific course information*

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

The lecture begins by introducing the concept of the fractional calculus and the associated Laplace transform. Then the definition and classification of the fractional differential equations are introduced as well. Then the concept of the linear fractional differential equations, systems of the linear fractional differential

equations and boundary value problems for the linear fractional differential equations are introduced.

This course is equipped with self-study activities through practice problems, discussion/review of material, and other forms of learning. Furthermore, to meet the demands of global developments in the mastery of technology for a bachelor of mathematics, participants of this course are also equipped with the skills to use Matlab software related to the linear fractional differential equations.

B. Prerequisites or co-requisites

MAT61122 Calculus I
MAT61142 Ordinary Differential Equation

C. Indicate whether a required or elective course in the program

Elective

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)

4th 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-1: Possesses a good ethics and integrity
      PI-2: Able to act in accordance with academic ethics
      PI-3: Able to act in accordance with academic integrity
ILO-2: Possesses profound knowledge of the basic concept mathematics
      PI-1: An ability to explain the basic concept mathematics
      PI-3: An ability to determine solution of the simple problems
          using the basic concept mathematics
ILO-3: An ability to identify, explain and generalise simple mathematical
      PI-1: An ability to identify simple mathematical problems
      PI-2: An ability to explain simple mathematical problems
      PI-3: An ability to generalise simple mathematical problems
ILO-4: An ability to use concept and fundamental technique of mathematics in
      solving simple mathematical problems
      PI-1: An ability to illustrate simple mathematical problems based on
          appropriate basic mathematical concepts and techniques
      PI-3: An ability to solve simple mathematical problems using the
          proper concept and mathematical fundamental techniques
ILO-5: An ability formally and correctly proves a simple mathematical statements
      using facts and methods that have been studied
      PI-1: An ability to identify the formal structures and analogy forms in
          mathematics
      PI-2: An ability to use fact and apply methods in proving simple
          mathematical statement
      PI-3: An ability to present simple mathematical statement proof rigorously
          (sequentially and conscientious)
      PI-4: An ability to conclude or interpret result of the proving
          simple mathematical statement
ILO-7: An ability to communicate effectively especially in the area of
      mathematics in with diverse communities
      PI-1: Able to convey ideas or study results orally, especially in the field of
          mathematics
      PI-2: Able to present ideas or study results in writing, especially in the field
          of mathematics
      PI-3: Able to respond to feedback given

8. *Course Learning Outcomes*

1. Students are able to understand the concept of fractional calculus, especially fractional integrals and fractional derivatives.

2. Students are able to understand the Laplace transformation of both the fractional integrals and the fractional derivatives.

3. Students are able to recognize the concept of linear fractional differential equations.

4. Students master the technique of solving the linear fractional differential equations.

5. Students master the technique of solving the system of the linear fractional differential equations.

6. Students are able to solve boundary value problems for the linear fractional differential equations.

7. Students are able to use the Matlab software to solve the linear fractional differential equations.

9. *Brief list of topics to be covered*
Fractional calculus and the associated Laplace transformation, fractional linear differential equations, system of the fractional linear differential equations, boundary problem for the fractional linear differential equations, use of Matlab software to find the solution of the fractional linear differential equations

10. Learning and teaching methods
Directed Learning, Teacher Center Learning

11. Language of instruction
Indonesia and English

12. Assessment methods and criteria

Summative Assessment :
1. Mid-term exam: 40%
2. Final exam: 40%
3. Assignment (home work): 20%