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|  | **STATE UNIVERSITY OF PADANG****FACULTY OF ENGINEERING****ELECTRONIC ENGINEERING DEPARTMENT** | **Document Code** |
| **SEMESTER LEARNING PLAN** |
| **COURSES** | **CODE** | **MK family** | **Creadits** | **SEMESTER** | **Compilation Date** |
| **Calculus and Algebra** | TIK1.61.1301 | Study Program Compulsory Courses | 2 credits (theory) | 1 | July 2017 |
| **AUTHORIZATION** | **RPS Developer Lecturer** | **RMK Coordinator** | **Head of PRODI** |
| **Delsina Faiza, ST, MT****NIP. 19830413 200912 2 002** | **Drs. Putra Jaya, MT****NIP. 19621020 198602 1 001** | **Ahmaddul Hadi, S.Pd., M.Kom.****NIP. 197612092005011003** |
| **Learning Outcomes (CP)** | **CPL-PRODI**  |  |
| CP - S1 | Believe in God Almighty and be able to show a religious attitude |
| CP - S9  | Demonstrate an attitude of responsibility for work in their field of expertise independently |
| CP - PP6 | Understand the basic concepts of mathematics, electrical and electronic science in the field of computers |
| CP - KU5 | able to make decisions appropriately in the context of problem-solving in their area of ​​expertise, based on the results of information and data analysis. |
| CP - KK6  | Ability to master basic mathematics, electrical and electronic science concepts for the development of computer systems |
| **CPMK** |  |
| CPMK1 | Understand the concept of linear equations |
| CPMK2 | Understand the concept of matrices to express the determinants of a square matrix, represent the inverse of a square matrix, solve sets of linear equations and eigenvalues |
| CPMK3 | understand the concept of complex numbers to represent complex number operations and express the polar and exponential form of complex numbers |
| CPMK4 | Understand the meaning and use of derivatives |
| CPMK5 | Understand the meaning and use of integrals |
| **Short Description MK** | Calculus and algebra have very important roles in the development of science and technology that is currently developing. This course is intended to provide provisions on the concepts of linear equations, matrices, eigenvalues and eigenvectors, complex numbers, derivatives, and integrals. |
| **Study Materials (Learning materials)** | 1. Linear Equations
2. Matrix
3. Devise complex
4. Derivative
5. Integral
 |
| **References** | **Main:** |  |
| 1. K.A Stroud (2003), Matematika Teknik edisi kelima, Erlangga, Jakarta
2. Dangan Mursita (2011), Matematika untuk perguruan tinggi, Rekayasa Sains, Bandung
 |
| **Supporters:** |  |
| 1. Danang Mursita (2010), Aljabar Linear, Rekayasa Sains, Bandung
2. Mary Attenborough (2003), Mathematics for Electrical Engineering and computing
 |
| **Learning Media** | **Software:** | **Hardware :** |
| MS Office 2019 | LCD & Projector |
| **Supporting lecturer** | Delsina Faiza, ST, MT |
| **Requirements course** | - |
| **Mg To-** |  **Sub-CPMK****(as the final expected ability)** | **Assessment Indicators** | **Criteria & Form of Assessment** | **Forms, Learning Methods & Assignments** **[ Estimated time]** | **Learning materials****[Library / Learning Resources]** | **Rating Weight (%)** |
| **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** |
| 1-2 | Understand the concept of linear equations | 1. Accuracy explains the definition of linear equations and their basic properties
2. Describe and describe the search for solutions to systems of simple linear equations
3. Describe and describe the search for a solution to a two-variable linear equation system
4. Describe and describe the search for a solution to a three-variable linear equation system
 | **Criteria:**1. Assessment quiz
2. Assessment assignments
 | * Lectures:

 Presentation **[TM: 2x (2x50 ")]**• **Task 1**: Solving problems about linear equations**[BT + BM: (2 + 2) x (2x60 ”)]** | 1. Simple linear equation
2. Two-variable linear equation
3. Three variable linear equation

**[1] p .: 167-181]** | **15%** |
| 3-7 | understand the concept of matrices and their operations, the determinants of a square matrix, represent the inverse of a square matrix, solve linear equations with matrices and eigenvalues | 1. The precision of describing the matrix and its types
2. Accuracy describes matrix algebraic operations
3. Broad and sharpness explain the definition of the determinant of the square matrix
4. The precision of determining the determinant of the matrix by cofactor expansion
5. Accuracy describes the relationship between the determinant and the inverse of the square matrix
6. The breadth and sharpness in explaining the search for solutions to linear equations using the matrix method
7. The breadth and sharpness in explaining the search for solutions to linear equations with the crammer's rule/method
8. Precise and sharpness describe elementary line operations
9. The breadth and sharpness in explaining the search for solutions to linear equations using the Gauss elimination method
10. The breadth and sharpness in explaining the search for solutions to linear equations using the Gauss Jordan Elimination method
11. Extent and sharpness explain eigenvalues ​​and eigenvectors
 | **Criteria:**1. Assessment quiz
2. Assessment assignments
 | * **Lectures:**

Presentation**[TM: 5x (2x50 ")]*** **Task-2: Solve matrix operation problems and matrix transpose**

**[BT + BM: (1 + 1) x (2x60 ”)]*** **Task-3: Solve the determinant and inverse matrix problems**

**BT + BM: (1 + 1) x (2x60 ”)*** **Task 4 - Solve linear equations using the matrix method, crammer rule, Gauss elimination and Gauss Jordan**

**BT + BM: (1 + 1) x (2x60 ”)*** **Task-5: Solve problems with eigenvalues and values**

**BT + BM: (1 + 1) x (2x60 ”)** | 1. Matrix definition and its types
2. Matrix algebra operations
3. Matrix transpose
4. The determinant of the square matrix
5. Cofactor matrix
6. Adjoint Matrix
7. The inverse of the square matrix
8. Solving linear equations using the matrix method
9. Solve linear equations with Crammer's rule
10. Elementary Line Operations
11. Solving linear equations using the Gauss elimination method
12. A solution of linear equations with Gauss Jordan Elimination
13. Eigenvalues ​​and Eigenvectors

**[1] p. : 495 - 524]** | **35%** |
| **8** | **Mid-Term Exam: Formative evaluation that is intended to improve the learning process based on the assessment that has been carried out** |  |
| 9-10 | understand the concept of operations and the form of complex numbers | 1. Accuracy in explaining the concept and presentation of complex numbers
2. Accuracy describes operations on complex numbers
3. Accuracy describes and can perform polar and exponential form calculations of complex numbers
4. Accuracy in explaining De Moivre's theory
 | **Criteria:**1. Assessment quiz
2. Assessment assignments
 | * Lectures:

Presentation **[TM: 2x (2x50 ")]** Task-6: Operations and complex number forms  **[BT + BM: (2 + 2) x (2x60 ”)]** | 1. The concept of complex numbers
2. Presentation of complex numbers
3. Complex number operations
4. Complex number form
5. De Moivre's Theorem

**[1] p. 389 - 412** | **15%** |
| 11-12 | Understand the meaning and use of derivatives | 1. Accuracy describes the definition of a derivative
2. The accuracy of describing the derivative of an algebraic function and can perform the calculation of the derivative
3. The accuracy of describing the derivative of the transcendent function and can perform the calculation of the derivative
4. The accuracy of describing the derivative of a multivariable function and can perform the calculation of those derivatives
 | **Criteria:**1. Assessment quiz
2. Assessment assignments
 | * Lectures:

Presentation **[TM: 2x (2x50 ")]****Task-6**: Solve problems about derivatives **BT + BM (2 + 2) x (2x60 ”)]** | 1. derived concept
2. Derivative algebraic functions
3. Derivative transcendent function
4. Multivariable function derivatives

**[2] p. 45-93** | **15%** |
| 13-15 | Understand the meaning and use of integrals | 1. Accuracy explains the concept of integrals
2. The accuracy of explaining the integral with the substitution method and can perform calculations with the integral method
3. The accuracy of explaining partial integrals and can perform calculations with the integral method
4. The accuracy of explaining the integral of partial fractions and can perform calculations with the integral method
5. The accuracy in explaining certain integrals and can perform calculations with the integral method
 | **Criteria:**1. Assessment quiz
2. Assessment assignments
 | * **Lecture**

 **[TM: 3x (2x50 ")]****Task-7**: Problem solving about trees **[BT + BM: (3 + 3) x (2x60 ”)]** | 1. Integral Concept
2. Integral by the substitution method
3. Partial integral
4. Partial fraction integral
5. Certain integral

**[2] p. 97-150** | **20%** |
| **16** | **UAS / Semester Final Examination: Evaluation which is intended to determine the final achievement of student learning outcomes** |  |