



Course	Course Name : Mathematics 2
	Course Code : KM184201
	Credit : 3
	Semester : 2

COURSE DESCRIPTION

Student learn mathematical thinking concept (existential solution, logic flow/procedure of solution) to solve the real problems and able to solve manipulation problems, modelling, other things about engineering that relate with integral application, and ability to join another advance courses that needs fundamental concept of mathematics and its analysis.

This course include : the concept of integral technique, definite integral concept, improper integral and its applications, polar coordinate and parametric equations also its applications, calculation of plane (geometry) area and arc length, sequences and infinite series, powers series, Taylor and Mac Laurin series.

COURSE GRADUATE LEARNING OUTCOME

1. Able to understand, analyze and solve mathematical problem.
2. Able to analyze and solve the phenomenon using mathematical model.
3. Able to implement mathematical thinking framework to solve optimisation problem both analytically and empirically.
4. Able to interpret the basic concept of mathematics and make the argumentation directly, indirectly, and also mathematical induction
5. Able to identify, create and solve mathematical model.
6. Able to analyse system and optimize its performance.
7. Able to identify simple problems, build and solve mathematical models.
8. Competent in understanding standard methods in mathematics.
9. Competent in understanding mathematics fundametal theory that include set concept, function, differential, integral, space, and mathematical structure.

COURSE LEARNING OUTCOME

1. Competent in fundamental concept of integral technique
2. Able to solve definite integral.
3. Able to apply definite integral for plane (geometry) area, volume by using disc method, washer method, center of mass, application of Guldin theorem, force and fluida pressure.
4. Able to understand polar coordinate system and parametric equations, able to draw the graphic, and apply it to plane (geometry) area and arc length.
5. Able to determine the convergent of series, able to examine the convergent of infinite series, and determine convergent infinite series, transformate function into Taylor or MacLaurin series form.

TOPIC

1. **Integral Tehcnique Concept:** Partial integral: integral of rational function (linear factors, quadratic factors), integral of trigonometry functions, reduction formula, integral with trigonometry substitution (root form)



2. **Definite Integral Concept** : the problem of area and definite integral, evaluate definite integral : Calculus Fundamental Theorem I, definite integral with substitution, definite integral functions, Calculus Fundamental Theorem II, and improper integral.
3. **Applications of Definite Integral**: plane (geometry) area, volume by using disc method and washer method, force and fluida pressure, work, center of mass and Guldin theorem.
4. **Polar Coordinate and Parametric Equations** : function and graphic in polar coordinate, area of plane and arc length in polar coordinate, function in parametric form, area and arc length of parametric function.
5. **Infinite Sequences and Series**: sequences, covergent sequences, infininte series, convergent test and determine the sum of infinite convergent series, definition of power series, Taylor and MacLaurin series.

REFERENCES

Main References :

1. Tim Dosen Jurusan Matematika ITS, *Buku Ajar Kalkulus 2* , Edisi ke-4 Jurusan Matematika ITS, 2012
2. Anton, H. dkk, *Calculus*, 10-th edition, John Wiley & Sons, New York, 2012

Supporting References

1. Kreyzig, E, *Advanced Engineering Mathematics*, 10-th edition, John Wiley & Sons, Singapore, 2011
2. Purcell, J, E, Rigdon, S., E., *Calculus*, 9-th edition, Prentice-Hall, New Jersey, 2006
3. James Stewart , *Calculus*, ed.7, Brooks/cole-Cengage Learning, Canada,2012

PREREQUISITE

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LEARNING
PROGRAM

