COURSE LEARNING OUTCOMES

DEPARTMENT: Mathematics

COURSE #: B4500 **COURSE TITLE: Dynamical Systems II** PRE-REQUISITES: Math A4500 CO-REQUISITES: None HOURS/CREDITS: 4/4 DATE EFFECTIVE: 1/24/21	**CATALOG DESCRIPTION :** Topics will be chosen from the areas of ergodic theory, topological dynamics, differentiable dynamics, complex dynamics and symbolic dynamics. Required Texts: • Clark Robinson. *Dynamical Systems: Stability, Symbolic Dynamics, and Chaos,* 2nd edition, CRC Press, 1998. • C. E. Silva, *Invitation to Ergodic Theory,* American Mathematical Society, 2007.

COURSE LEARNING OUTCOMES

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. To rigorously prove fundamental measure theoretic results about dynamical systems, such as the Poincare recurrence theorem.	e, f, g
2. To use methods and concepts from measure theory to define properties of dynamical systems, e.g., measure preservation, recurrence, ergodicity.	c, e, g
3. To prove that specific dynamical systems have certain measure theoretic properties.	a, b, f, g
4. To state and use ergodic theorems, such as the Birkhoff ergodic theorem.	b, c, e, g
5. To understand the role of renormalization in understanding specific families of dynamical systems, such as interval exchange maps.	a, b, g
6. To understand and use fundamental concepts of measure theory, such as sigma algebras, measurable maps, and measures.	c, e, f, g

COURSE ASSESSMENT TOOLS
Please describe below all assessment tools that are used in the course.
You may also indicate the percentage that each assessment contributes to the final grade.

1. Term Grade: One Midterm (20%), Homework, Quizzes and Classwork (40%)
2. Final Exam (40%)

DEPARTMENTAL LEARNING OUTCOMES *(to be filled out by departmental mentor)*
The mathematics department, in its varied courses, aims to teach students to
a. perform numeric and symbolic computations
b. construct and apply symbolic and graphical representations of functions
c. model real-life problems mathematically
d use technology appropriately to analyze mathematical problems
e. state (e1) and apply (e2) mathematical definitions and theorems
f. prove fundamental theorems
g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.