# COURSE SYLLABUS

**Course Information**

## STOCHASTIC PROCESSES

**SPRING 2026** **STAT 4382**

View Syllabus Online from https://coursebook.utdallas.edu/myclasses

| SECTION | CALL NO | DAY / TIM | CLASSROOM |
|---|---|---|---|
| 4382.001 | 22242/012122 | M W 11 :30 AM – 12 :45 PM | FO 2.404 |

**Professor Contact Information**

**DR. YULY KOSHEVNIK**
**Office: FA 2.408** **Phone: 972-883-4178** **Email: yuly.koshevnik@utdallas.edu**
**Office Hours:** M T W R => 1:00 – 2:00, F => 12:00 – 2:00

**Course Pre-requisites, Co-requisites, and/or Other Restrictions**

**STAT 4351** or equivalent

**Course Modality and Expectations**

| | |
|---|---|
| **Instructional Mode** | Traditional |
| **Course Platform** | The course will be taught in classroom. Homework assignments will be posted on E-Learning. Class notes will be provided weekly. |
| **Expectations** | Students are expected to attend the class, read regularly posted notes and submit homework on time. All exams will be conducted **IN CLASS**. |

## Course Description

STAT 4382 - STAT 4382 - Stochastic Processes (3 semester credit hours) Stochastic models including discrete and continuous time Markov chains, random walks, Poisson processes, birth-and-death processes, finite-state Markov chains, renewal processes, queuing systems, Gaussian processes and related topics including Brownian motion and Brownian bridge processes. Prerequisite: STAT 4351 or equivalent. (3-0) S

## Student Learning Objectives/Outcomes

The overriding objective of this course is to make certain that each student knows the theoretical methods of probability models and stochastic processes – including Markov chains, counting and continuous stationary processes, and basics of the renewal and queuing theory with applications.

Class Notes will be regularly posted on E-Learning. They provide a summary of material studied in class.

**Required Textbooks and Materials**

1. [**HK**] N. Humphreys and Y. Koshevnik: Stochastic Processes with Actuarial Applications ISBN: 979-8-8233-8872-6
2. **[PK] An Introduction to Stochastic Modeling**, 4th Edition by M. Pinsky and S. Karlin Imprint: Academic Press – ISBN: 978-0-12-381416-6 [Additional Source]

| IMPORTANT DATES & HOLIDAYS | |
|---|---|
| CLASSES START | WEDNESDAY, JANUARY 21 |
| CENSUS DAY | WEDNESDAY, FEBRUARY 4 |
| DROP (APPROVAL REQUIRED) | THURSDAY, FEBRUARY 5 – WEDNESDAY, APRIL 8 |
| INTERMEDIATE EXAM 1 | WEDNESDAY, FEBRUARY 18 |
| SPRING BREAK | MONDAY, MARCH 16 – SUNDAY, MARCH 22 |
| INTERMEDIATE EXAM 2 | WEDNESDAY, APRIL 1 |
| COURSE OVERVIEW | WEDNESDAY, APRIL 29 – MONDAY, MAY 4 |
| LAST DAY OF CLASSES | WEDNESDAY, MAY 6 |
| LAST EXAM | WEDNESDAY, MAY 6 |

The general policies can be viewed from

**http://coursebook.utdallas.edu/syllabus-policies**

## Grading Policy

Your OVERALL class grade will be determined based on the following weighting:

**Two Intermediate Exams + Exam 3** **(25% + 25% + 30%) = 80%**

**Ten Homework Assignments (ONLINE)** **20%**

Make-up exams will **not** be allowed, unless extraordinary circumstances emerge.

**Grading Scale:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **[97, 100]** | **[93, 97)** | **[90, 93)** | **[87, 90)** | **[83, 87)** | **[80, 83)** | **[77, 80)** |
| **A+** | **A** | **A -** | **B+** | **B** | **B -** | **C+** |
| **[73, 77)** | **[70, 73)** | **[67, 70)** | **[63, 67)** | **[60, 63)** | **Below 60** | |
| **C** | **C -** | **D+** | **D** | **D -** | **F** | |

**Course & Instructor Policies**

- You must catch up with the course – particularly ALL EXAMS.
- Homework will be assigned according to the tentative schedule below. Papers will be collected via ONLINE submission and graded within one week.
- My office hours should be utilized when you need to clarify the course topics. Use this option, once you feel any uncertainty about the material.

| TENTATIVE COURSE OUTLINE | | |
|---|---|---|
| Dates | Topics | References to [HK] / Notes |
| 01/21 – 01/28 | Review of Probability – Random Variables<br>HW 1 => Due 01/28 | Introduction + Notes [1] |
| 01/28 – 02/04 | Conditional Probabilities and Expectations<br>HW 2 => Due 02/04 | Notes [1 – 2] |
| 02/09 – 02/16 | Markov Chains – Introduction<br>Long Run Properties of Markov Chains<br>HW 3 => Due 02/11 | Ch. 1 + Notes [3 – 4] |
| 02/16 | Exam I Review | Ch. 1 + Notes [1 – 3] |
| **02/18** | **Exam I** | |
| 02/23 – 03/04 | Poisson Processes and Related Topics<br>HW 4 => Due 02/25 \| HW 5 => Due 03/04 | Ch. 2 + Notes [5] |
| 03/04 – 03/11 | Birth and Death Processes<br>Continuous Time Markov Chains<br>HW 6 => Due 03/11 | Ch. 3 and 4+ Notes [6 – 7] |
| **03/16 – 03/22** | **Spring Break** | **No Classes** |
| 03/23 – 03/30 | Continuous Time Markov Chains<br>HW 7 => Due 03/25<br>Renewal Theory – Introduction and Sketch | Ch.5 + Notes [7] |
| 03/30 | Exam II Review | Ch. 3 – 6<br>Notes [3 – 7] |
| **04/01** | **Exam II** | |
| 04/06 – 04/15 | Queuing Theory<br>HW 8 => Due 04/15 | Ch. 6 + Notes [8] |
| 04/15 – 04/29 | Brownian Motion and Related Topics<br>HW 9 => Due 04/22 \| HW 10 => Due 04/29 | Ch. 7 + Notes [9] |
| 04/29 – 05/04 | Course Overview | Ch. 7 + Notes [8 – 9] |
| **05/06** | **Exam III** | |

***These descriptions and timelines are subject to change at the discretion of the Professor.***