METU INSTITUTE OF APPLIED MATHEMATICS

Course Title:	**Stochastic Processes**
Course Code:	**IAM 542**
Credit:	**3(3-0)**
Instructor's Name:	Martin Rainer
Prerequisites:	Consent of instructor
Content:	Markov chains: Definition and Examples, Multistep Transition Probabilities, classification of states, limit behavior, Some special Examples, One-step Calculastions, Infinite state spaces, Proof of convergence theorems, Poisson Processes, Compound Poisson processes, Thining and Superpositions, Conditioning, Spatial Poisson Processes. Continuous time Markov Processes . Queueng theory, Renewal Theory and its applications, Reliability Theory.
Aims:	Stochastic processes, specially the Markov processes constitute important modelling tools for many areas such as Communication theory, Opeation Research, Management Sciences, Financial and Actuarial Sciences, Network performence evaluation, Beharioral sciences, etc. The aim of this course is to introduce the most currently used Markov chains, those taking values in Countable spaces and later the continuous time Markov processes and their applications to queueing theory, Also Renewal theory and Reliability theory will be discused wilh some applications.
Suggested Textbooks:	Rich Durretl, Essentials of Stochastic Processes, Spinger Sheldon M. Ross, Introduction to Probabilitiy Models, Academic Press
Outline:	• Markov Chains: Definition and Examples, Multistep Transition Probabilities, Cassification of states, Limit Behavior, Some special examples, One-step. Calculations, Infinite state spaces, Proof of the Convengence Theorems (3 Weeks) • Poisson Processes:Exporential distribution, Defining the Poisson processes and Compund poisson processes, Thinning and Superposition, Conditioning, Spatial Poisson Processes (2 Weeks) • Continuous time Markov chains (3 Weeks) • Renawal theory and its Applications (2 Weeks) • Reliability Theory (2 Weeks)
Resources:	Erhan Çınlar, Introduction to Stochastic processes Prentice-Hall, Inc.