The Republic of Iraq
Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority

University: Shatt Al-Arab University
College: College of technical Engineering

Department Laser and Optoelectronics Engineering Technology
The Second stage
Lecturer Name: Dr.rasheed Almansory
Academic qualification
Place of work: Shatt Al-Arab University

weekly lesson schedule

Course Lecturer	**Dr.Rasheed Almansory**
e-mail	**rasheed.sabah@sa-uc.edu.iq**
Title	Probability Theory
Course Coordinator	
Course Objectives	• **To provide advanced knowledge of digital systems and their applications in laser and optoelectronics.** • • **To enable students to design, analyze, and implement digital circuits relevant to optical and photonic devices.**
Course Description	This course provides a comprehensive introduction to the basic principles of lasers. This understanding focuses on how lasers are produced, how their properties are controlled, and how they interact with different materials. It also includes a study of the principles of stimulated emission, the formation of laser beams, and their unique properties (coherence, collimation, monochromaticity, and directivity). The study includes learning about the different types of lasers, such as solid-state lasers, gas lasers, liquid lasers, and semiconductor lasers, with an understanding of the working mechanism of each type. Students are trained to use different laser devices, understand how they work, and perform basic maintenance. Students are trained to use different laser devices, understand how they work, and perform basic maintenance. .
Textbooks	1. *Principles of Lasers*, by O. Svelto. *2-Laser Fundamentals* by W. T. Silfvast **Lasers, by A. Siegman** **Lasers fundamentals and applications by K. Thyagarajan, A. Ghatak**

final exam 50	**project**	**Assignment**	**daily exams**	**lab**	**Midterm Exam**
	10	**10**	**10**	**10**	**10**
General Notes					

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Week	Date	Topics Covered	Number of Hours	Notes
١	**13-11-2024**	Combinatorial Analysis, The Basic Principle of Counting, Permutations, Combinations, Multinomial Coefficients		
٢	**20-11-2024**	Axioms of Probability, Sample Space and Events, Axioms of Probability , Some Simple Propositions, Sample Spaces Having Equally, Probability as a Continuous Set, Probability as a Measure of Belief		
٣	**27-11-2024**	Conditional Probability and Independence, Conditional Probabilities, Bayes's Formula, Independent Events, P(·|F) Is a Probability .		
٤	**4-12-2024**	Random Variables, Random Variables, Discrete Random Variables, Expected Value, Expectation of a Function of a Random Variable. Variance 4.6 The Bernoulli and Binomial Random Variables, Properties of Binomial Random Variables, Computing the Binomial Distribution Function, The Poisson Random Variable, Computing the Poisson Distribution Function, The Geometric Random Variable, The Negative Binomial Random Variable, The Hypergeometric Random Variable, The Zeta (orZipf) Distribution, Expected Value of Sums of Random Variables, Properties of the Cumulative Distribution Function		
٥	**11-12-2024**	*Midterm*		
٦-٧	**18-11-2024** **25-11-2024**	Continuous Random Variables, Expectation and Variance of Continuous Random Variables, The Uniform Random Variable, Normal Random Variables, The Normal Approximation to the Binomial Distribution, Exponential Random Variables, Hazard Rate Functions, Other Continuous Distributions, The Gamma Distribution, The Beta Distribution		
٨-٩	**8-1-2025-**	Limit Theorems, Chebyshev's Inequality and the Weak Law of Large Numbers, The Central Limit		

		Theorem, The Strong Law of Large Numbers, Other Inequalities, Bounding the Error Probability When Approximating a Sum of Independent Bernoulli Random Variables by a Poisson Random Variable		
١٠-١١-١٢	**15-1-2025** **22-1-2025**	The Poisson Process, Markov Chains, Surprise, Uncertainty, and Entropy, Coding Theory and Entropy,		
١٣-١٤	**29-1-2025** **5-2-2025**	General Techniques for Simulating Continuous Random Variables, The Inverse Transformation Method, The Rejection Method, Simulating from Discrete, Distributions, Variance Reduction Techniques, Use of Antithetic Variables Variance Reduction by Conditioning, Control Variates		
١٥	**12-2-2025**	Combinatorial Analysis, The Basic Principle of Counting, Permutations, Combinations, Multinomial Coefficients		

lecturers signature: **Head of Department signature:**