Admission Test for Graduate Programs

Date: Tuesday, 28 April 2026
Time: 3:00pm-5:00pm
Location: Khaldiya Campus:

- FinTech (in the **Library**)
- Data Science & AI/Cybersecurity Engineering/Biomedical Engineering/Energy Systems Engineering (in **Cafeteria 10**)

Notes:

1) Only simple, non-financial/non-programmable calculators are allowed.
2) The test is administered in a paper-based format and consists of multiple-choice questions.

Cybersecurity Engineering/Data Science and AI

Subject	Topics	References
Mathematics for computing and Engineering	Linear algebra basics, calculus I, discrete mathematics, and foundations of logic and proofs. (Ref1: Chapters 1, 2 and 4, Ref3: Chapters 1, 2, 3, 4, 5, and 6, and Ref4: Chapter 1)	**Ref1:** Linear Algebra and Its Applications Fourth Edition Gilbert Strang, 2006, Link
Probability and Statistics	Probability, discrete/continuous random variables and probability distribution, joint probability distributions and random samples, and statistical intervals (Ref2: Chapter 2, Ref2: Chapters 3 and 4, Ref2: Chapter 5, and Ref2: Chapter 7)	**Ref2:** Devore, J. L. (2013). Probability and Statistics for Engineering and the Sciences (8th ed.). Cengage Learning. Link **Ref3:** Thomas' Calculus Early Transcendentals Thirteenth Edition 2014 Link **Ref4:** Discrete Mathematics and Its Application, 8th Edition, Mc Graw Hill Education, Kenneth H. Rosen, 2019 Link
Programming Skills	Programming fundamentals (Chapter 3), Object-oriented concepts (Chapter 4), Inheritance and Polymorphism (Chapter 5)	Horstmann, C. S. (2022). Core Java, Volume I: Fundamentals (12th ed.).

		Pearson. ISBN: 978-0137673629
Data Structures and Algorithms	Data structures (Ref1: Chapter 3, 6, 8 and 14 Searching, sorting and recursion (Ref1: Chapter 5, Chapter 11 and 12) Algorithm analysis (Ref1: Chapter 4) Problem-solving techniques (Ref2: Chapter 3, Chapter 9, and Ref2: Chapter 5)	**Ref1:** Goodrich, M. T., Tamassia, R., & Goldwasser, M. H. (2014). Data Structures and Algorithms in Java (6th ed.). Wiley. ISBN: 978-1118771334. **Ref2:** Introduction to the Design & Analysis of Algorithms, Third Edition. Anany Levitin. Pearson 2012.
Networks and Operating Systems	Fundamentals of Computer Networks (Ref1: Chapter 1), TCP/IP stack (Ref1: Chapter 2 to Chapter 6), OS: Process Management (Ref2: Chapters 4, 6, and 7), OS: Memory Management (Ref2: Chapter 16 and Chapter 18).	**Ref1:** Kurose, J. F., & Ross, K. W. (2021). Computer Networking: A Top-Down Approach (9th ed.). Pearson. ISBN: 978-0136681557. Link **Ref2:** Arpaci-Dusseau, R. & Arpaci-Dusseau, A. (2023). Operating Systems: Three Easy Pieces. Link

Biomedical Engineering/Energy Systems Engineering

Subject	Topics	References
Mathematics	**Calculus:** Differentiation, integration, partial derivatives, multiple integrals, and applications (e.g., optimization, area/volume calculations). **Linear Algebra:** Matrix operations, determinants, eigenvalues/eigenvectors, systems of linear equations. **Differential Equations:** First-order and second-order ODEs, Laplace transforms, and their applications in modeling physical systems. **Complex Numbers:** Polar and Cartesian forms, Euler's formula. **Numerical Methods:** Root-finding methods (e.g., Newton-Raphson), numerical integration, and solving differential equations numerically.	Lay, McDonald , "Linear Algebra and Its Applications: Global Edition", Pearson Publishers 6th ed., 2022. R.K. Nagle, E.B. Saff, and A.D Snider, "Fundamentals of Differential Equations", Pearson 9th ed., 2019.
Physics	**Mechanics:** Newton's laws, work-energy theorem, conservation of energy, and momentum. **Kinematics:** Rectilinear and curvilinear motion, velocity, acceleration, and relative motion. **Kinetics:** Newton's second law, work-energy principle, impulse-momentum principle. **Force Systems:** Resultant forces, moments, and couples. **Equilibrium:** Conditions for static equilibrium, free-body diagrams. **Structural Analysis:** Trusses, beams, and frames; shear force and bending moment diagrams. **Friction:** Static and kinetic friction, angle of repose. **Electricity and Magnetism:** Coulomb's law, electric fields, magnetic fields, Faraday's law, and electromagnetic induction.	H. D. Young and R. A. Freedman, "University Physics", 15e in SI Units – Global Edition, 2020.
Thermodynamics	**Basic Concepts:** Properties of pure substances, state postulate, and processes. **First Law of Thermodynamics:** Energy balance, internal energy, enthalpy, and work. **Open and Closed Systems** **The Second Law of Thermodynamics**	Yunus Cengel, Michael Boles, "Thermodynamics: An Engineering Approach", 9e McGraw-Hill Higher Education, 2021.
Electrical Circuits	**Circuit Elements:** Resistors, capacitors, inductors, and sources (voltage/current). **Circuit Analysis:** Kirchhoff's laws, node-voltage method, mesh-current method. **AC Circuits:** Impedance, phasors, power factor, and resonance.	Allan R. Hambley, "Electrical Engineering: Principles & Applications", Pearson 7e, 2018.

	Transient Analysis: RC, RL, and RLC circuits; time constants. **Applications:** basic Op Amp circuits (inverting, non-inverting, adders, subtractors, etc.).	
Statistics	**Descriptive Statistics:** Mean, median, mode, variance, standard deviation. **Random Variables:** Discrete and continuous distributions (e.g., binomial, normal, exponential). **Regression Analysis:** Linear regression, correlation coefficient.	Douglas C. Montgomery and George C. Runger, "Applied Statistics and Probability for Engineers", Wiley 7e, 2020.

FinTech and Risk Management

Subject	Topics	References
Algebra and Calculus Basics	Linear equations (Chapter 1), Quadratic, Exponential & logarithmic functions (Chapter 2), Percentages, Geometric Series (Chapter 3), Differentiation & Optimization (Chapter 4)	Mathematics for Economics and Business, 10th edition, Pearson, Ian Jacques.
Probability, Statistics and Data Visualization	Understanding and analyzing graphs, charts, and numerical trends (Chapter 2), Numerical Descriptive Measures (Chapter 3), Distributions: Normal, binomial, Poisson (Chapters 5, 6), Confidence Intervals (Chapter 8), Hypothesis Testing (Chapter 9), Regression Analysis (Chapter 12)	Essentials of Business Statistics, Communicating with Numbers, Jaggia/Kelly, McGraw Hill.
Microeconomics	The scope and method of economics (Chapter 1), The economic problem: scarcity and choice (Chapter 2), Demand & Supply Analysis (Chapter 3), Elasticity of Demand & Supply (Chapter 5), The behavior of profit maximizing firms (Chapter 7), Short run and long run costs and output decisions (Chapters 8,9)	Principles of Microeconomics, 13th edition, Case, Fair, Oster, Pearson.
Macroeconomics	Introduction to Macroeconomics (Chapter 5), Measuring National Output and National Income (Chapter 6), Unemployment, Inflation and Long run Growth (Chapter 7), Money and Interest Rates (Chapter 10)	Principles of Macroeconomics, 13th edition, Case, Fair, Oster, Pearson.
Finance	Present Value, Future Value, Simple vs. Compound Interest (Chapter 2), Valuing Bonds and Stocks (Chapter 3, 4), Risk and Diversification (Chapter 7), Net Present Value and Other Investment Criteria (Chapter 5)	Brealey, Myers, & Allen, Principles of Corporate Finance, 14th edition.
Fintech	Introduction (Chapter 1), Business Process Management (Chapter 2), Technology Solution Delivery (Chapter 4), Market Risk Management (Chapter 18), Operational and Compliance Risk (Chapter 19)	Financial Services Technology: Processes, Architecture and Solutions, 2nd Edition, Cengage.
Risk Management	What is risk and why is it important? (Chapter 1, Pages: 15-19, 26), Origin of risk management, taking calculated risk, enterprise risk management, principles of risk management, objectives of risk management, risk management activities (Chapter 03, Pages: 42,45,48,52-54), Use of risk management standards for listed companies, Risk management process, updating risk	Fundamentals of Risk Management: Understanding, Evaluating, and Implementing Effective Enterprise Risk Management by Paul Hopkin & Clive Thompson, 6th Edition,

	management terminologies (Chapter 04, Pages: 60,61,67), Defining Enterprise risk management (ERM), ERM in practice, ERM & business continuity practices (Chapter 06, Pages: 85-87), Assessing Risk: Consideration, Causes, & Consequences (Chapter 10, Pages: 115-117)	Publishers: Kogan Page London.