

**Required courses for BSIE (Bachelor of Science in Industrial Engineering)**

*Prerequisite courses to be completed prior to department admission*

COURSE CODE	COURSE TITLE & DESCRIPTION	PRE/ CO-REQUISITE	FALL	SPRING	SUMMER
<b>EGN 3443</b>	<b>Probability and Statistics for Engineers</b> An introduction to the basic concepts of statistical analysis with special emphasis on engineering applications.	PR: MAC 2282	X	X	X
<b>EGN 3615</b>	<b>Engineering Economics w/Social &amp; Global Implications</b> Presents basic economic models used to evaluate engineering activities and an understanding of the social and ethical implications of financial decisions in a multicultural environment through lectures, case studies and current readings.		X	X	X
<b>EGN 4450</b>	<b>Introduction to Linear Systems</b> An introduction to the basic concepts of systems of linear equations, matrix and matrix operations, vector operations and vector space.	PR: MAC 2282	X	X	X
<b>EGN 1113</b>	<b>Intro to Design Graphics</b>		X	X	X

*Industrial Engineering - Core Courses*

COURSE CODE	COURSE TITLE & DESCRIPTION	PRE/ CO-REQUISITE	FALL	SPRING	SUMMER
<b>EIN 4621</b>	<b>Manufacturing Processes</b> The study of basic manufacturing processes and precision assembly. CAD/ CAM including NC programming.	PR: EGN 1113	X		
<b>ESI 4312</b>	<b>Foundation of Optimization</b> Basic techniques for modeling and optimizing deterministic systems with emphasis on linear programming and basic mixed integer programming. Compute solution of optimization problems. Applications to production, logistics, and service systems.	PR: EGN 4450, CR: ESI 4007	X		
<b>EIN 4312C</b>	<b>Work Analysis</b> Operation analysis and workspace design, work measurement, standard data, ergonomics, and labor costing	PR: EGN 3615 & EGN 3443	X		
<b>ESI 4007</b>	<b>Engineering Programming</b> A problem-based approach to describing programming concepts using Visual Basic for Applications and MS Excel.	PR: MAC 2281, CR: ESI 4312	X		
<b>EIN 4333</b>	<b>Production Control</b> Planning and control of production systems. Includes forecasting and inventory control models, scheduling, and sequencing, MRP, CPM/PERT, and resource requirements.	PR: ESI 4312, EGN 3443		X	
<b>ESI 4221</b>	<b>Industrial Statistics Quality Control</b> This course will present the theory and methods of quality monitoring including process capability, control charts, acceptance sampling, quality engineering, and quality design.	PR: EGN 3443		X	
<b>ESI 4313</b>	<b>Probabilistic Operations Research</b> Probabilistic models in Operations Research. Discrete and continuous time processes, queuing models, inventory models, simulation models, Markovian decision process and decision analysis	PR: ESI 4007, EGN 3443		X	
<b>ESI 4620</b>	<b>Principals of Data Engineering</b> Relational database model and structured query language, the use of design methodologies for developing functional and informational architectures for enterprise resource planning in production control and service systems, the implementation of user interfaces in forms and reports and web-enabled order fulfillment applications.	PR: ESI 4007, EGN 3443		X	
<b>ESI 4606</b>	<b>Engineering Analytics I</b> Evaluate a large database, reduce dimensionality, identify appropriate solution approaches, apply methods of supervised and unsupervised data mining, visualize data and outcomes, and assess the quality and usefulness of the developed models.	PR: ESI 4312, EGN 3443	X		
<b>ESI 4244</b>	<b>Design of Experiments</b> Activity forecasting models and control; design and use of inventory control models, both designs applicable to engineering analyses; analysis of variance and regression.	PR: EGN 3443	X		
<b>ESI 4523</b>	<b>Systems Simulation</b> Design and modification of industrial production and material handling facilities. Basic facilities design and analysis techniques, study of computer aided layout algorithms and study of warehousing operations.	PR: ESI 4313	X		
<b>EIN 4601C</b>	<b>Automation and Robotics</b> Introduction to the practices and concepts of automation as applied to material handling, inventory storage, material transfer, industrial processes, and quality control.	PR: EIN 4621	X		
<b>ESI 4607</b>	<b>Engineering Analytics II</b> Data Exploration, data visualization, large-scale engineering system decomposition using ANOVA, multiple regression and LASSO, principal component and analysis and K-mean clustering for system reduction; predictive modeling using logistic regression and support vector machines to facilitate engineering decisions.	PR: ESI 4606	X		