

Department of Mechanical Engineering and Industrial Engineering

Contact Information

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The graduate programs in Mechanical Engineering, Industrial Engineering, and Mechatronics Engineering are designed to instill fundamental concepts as well as practical knowledge of modern engineering and to prepare students for immediate engineering challenges as well as a lifetime of professional advancement. Research laboratories are available for work in robotics and automation, dynamical systems and controls, unmanned aerial vehicles, additive manufacturing, composite structures, thermal systems, computer integrated engineering design, renewable energy, simulation and optimization, and radiation effects on materials.

Degrees Offered

- The Ph.D. degree is available in Engineering.
- The Master of Science degree is available in both Mechanical Engineering and Industrial Engineering.

Industrial Engineering (IEEN)

IEEN 5301 Advanced Probs in Indus Eng **1-3 SCH (1-3)**

Individual or group research on advanced problems conducted under the supervision of a faculty member. Maximum credit 6 semester hours.

IEEN 5303 Advance Topics in Indus Eng **1-3 SCH (1-3)**

One or more advanced topics. May be repeated when topic changes.

IEEN 5305 Graduate Research Project **1-3 SCH (1-3)**

Designed for project option students and requires completion of research project. Prerequisite: departmental approval. May be repeated for a maximum of 7 semester hours.

IEEN 5306 Thesis **1-3 SCH (1-3)**

Designed for thesis option students. The course requires completion of thesis research. Prerequisite: departmental approval. May be repeated for maximum of 10 semester hours.

IEEN 5310 Risk Management **3 SCH (3-0)**

This course covers the advanced concepts and theories of the tools and techniques used in risk management at corporate, strategic business and project level and discusses a risk management mechanism for the sequencing of risk assessment through corporate, strategic and project stages of an investment.

IEEN 5311 Standards Prod Design & Manf **3 SCH (3-0)**

Advanced knowledge of standardization, anatomy and framework of standards, standards development process, and strategies to search standards and database.

IEEN 5312 Supply Chain Management **3 SCH (3-0)**

The management of material and information flows in multi-stage production-distribution networks. Provide students with the knowledge and the tools necessary to develop, implement, and sustain strategies for managing supply chain issues, especially the material and inventory management in supply chain.

IEEN 5313 Inventory Systems **3 SCH (3-0)**

Deterministic/stochastic systems with static/dynamic models. Use of forecasting techniques. Practice of inventory management, manual and computerized procedures and MRP. Case studies in inventory systems management. Prerequisite: 3 hours undergraduate Production and Inventory Control or equivalent.

IEEN 5314 Activity Scheduling **3 SCH (3-0)**

Deterministic/stochastic sequencing problems with static/dynamic models. Problems involving single and multiple facilities (flow shop, job shop). Problems involving different measure of effectiveness, solution techniques (optimizing, heuristic). Industrial scheduling problems.

IEEN 5315 Nonlinear Programming **3 SCH (3-0)**

Quantitative procedures for optimization techniques; steepest ascent/descent; gradient methods. Nonlinear problems such as quadratic programming, geometric programming, convex programming, separable programming, etc. Prerequisite: 6 hours of undergraduate operations research or equivalent and graduate standing.

IEEN 5319 Game Theory 3 SCH (3-0)

An introduction to game theory and strategic thinking. Dominance, Nash equilibrium, normal-form and extensive-form games, repeated games, static games with complete and incomplete information, dynamic games with incomplete information, mechanism design. Prerequisite: Graduate standing or permission from the instructor.

IEEN 5320 Fundamentals Sustainable Eng 3 SCH (3-0)

Fundamental concepts and definitions in sustainable engineering, approaches and applications of sustainability including societal, environmental and economic sustainability, and new trends in sustainability concept development for engineering.

IEEN 5321 Computer Appl of Stats Methods 3 SCH (3-0)

Extreme value distributions, multivariate normal distribution, simple and multiple regression analyses, analysis of variance, time series analysis, a survey of nonparametric statistics, chi square, t and F distributions. Prerequisite: undergraduate course in Applied Methods in Engineering Statistics or the equivalent.

IEEN 5322 Compu Simulation of Indust Sys 3 SCH (3-0)

Introduction to simulation, a survey and application of computer languages suitable for Monte Carlo simulation of random processes, model construction, advantages and shortcomings of simulation techniques, programming with simulation languages.

IEEN 5323 Occupational Biomechanics 3 SCH (3-0)

Study of the structure and function of musculo-skeletal system of the human body, kinetic and kinematic models, link segment diagrams and 3-D static modeling. Applying bio-instrumentation to determine the human performance, work capacity and muscle strength evaluation. Biomechanical considerations in machine control and work place design.

IEEN 5324 Ergonomics 3 SCH (3-0)

Application of ergonomic principles to the work environment. Design of the system to fit and interact with the human operator. Collection and utilization of anthropometric data in the design of workstations, tools, safety equipment and VDT workstations. Study of the interaction between human operator and the environment including the effect of noise, improper lighting, vibration, heat and cold on physical and mental performance.

IEEN 5325 System Safety 3 SCH (3-0)

Application of engineering design and management of industrial prevention models along with ethical responsibilities to eliminate, prevent or control hazards throughout the life cycle of a project, program, procedure or activity.

IEEN 5326 Decision Analysis 3 SCH (3-0)

Sources of information, prediction and judgment, subjective probability bidding policy. Statistical decision theory including utility functions, risk and uncertainty, min-max and Bayes strategy. Prerequisite: IEEN 5329 or equivalent.

IEEN 5327 Adv Engineering Project Mnmt 3 SCH (3-0)

This course covers the advanced concepts and theories of project modeling and optimization, project scheduling, resource allocation, economic analyses and project decision analysis. Prerequisite: permission of the instructor.

IEEN 5328 Reliability Theory 3 SCH (3-0)

Reliability analysis with emphasis on the exponential, Weibull, gamma, log normal and extreme value distributions; reliability of systems, redundancy; maintainability and availability. Prerequisite: IEEN 5313.

IEEN 5329 Advanced Eng Economic Analysis 3 SCH (3-0)

Continuation of Engineering Economic Analysis including funds flow, utility, price changes, investment, growth, replacement, taxes, capital budgeting and managerial economics. Prerequisite: 3 hours undergraduate course in Engineering Economic Analysis or equivalent.

IEEN 5330 Computer Intergrated Design 3 SCH (3-0)

Overview to the fundamental principles and concepts underlying CAD/CAD/CAE systems. Emphasis on three dimensional parametric and feature-based CAD/CAM systems. Introduction to the concurrent design approach - design for manufacturing, design for assembly, design for reliability, design for maintainability are introduced. Applications of artificial intelligence in CAD/CAM system. Enhancement of student's application and development skills of CAD/CAM software.

IEEN 5331 Compu Integrated Manuf Syst 3 SCH (3-0)

Advanced systems concept of Computer Integrated Manufacturing Advanced system, definition of manufacturing and its various levels, planning and control of product movement through the production systems, successful use of Automation, Robotics, Just-In-Time Manufacturing and Knowledge Based Systems. Prerequisite: MEEN 5303.

IEEN 5332 Mfg System Design 3 SCH (3-0)

Systematic description of the underlying behavior of manufacturing systems. Topics include basic factory dynamics, corrupting influence of variability, push and pull production systems, human element in manufacturing systems design and supply chain management.

IEEN 5333 Six Sigma and ISO Standards 3 SCH (3-0)

Introduction to six sigma approach, DMAIC model, ISO standards, and continual improvement philosophy. Study and research on using six sigma to meet ISO 9000, and use the ISO 9000 Framework to Assess a Six Sigma System. Practical case studies and projects will be pursued.

IEEN 5334 Lean Manufacturing 3 SCH (3-0)

Identifying key Lean concepts for manufacturing and defining these concepts for products/process design. Understanding Lean terminology, value stream mapping for manufacturing systems, design of Lean equipment, product cell design, operator job design and five steps to kaizen. Lean manufacturing approach to help reduce manufacturing costs, reduce or eliminate waste and increase profit margins.

IEEN 5335 Principles of Optimization 3 SCH (3-0)

Nonlinear Optimization: convexity, Kuhn-Tucker conditions, theory of duality. Linear and combinatorial optimization. Dynamic optimization. Prerequisite: 6 hours of undergraduate operations research or equivalent.

IEEN 5336 Linear Prog & Extensions 3 SCH (3-0)

Theory of linear programming including the simplex method, duality, sensitivity analysis, decomposition principles, the transportation problems and integer programming. Prerequisite: IEEN 5335 or equivalent.

Mechanical Engineering (MEEN)**MEEN 5301 Advanced Probs in Mech Eng 1-4 SCH (1-4)**

Individual or group research on advanced problems conducted under the supervision of a faculty member. Maximum credit 8 semester hours.

MEEN 5303 Advanced Topics in Mech Eng 1-3 SCH (1-3)

One or more advanced topics. May be repeated when topic changes.

MEEN 5305 Graduate Research Project 1-3 SCH (1-3)

Designed for project option students and requires completion of research project. Prerequisite: departmental approval. May be repeated for a maximum of 7 semester hours.

MEEN 5306 Thesis 1-3 SCH (1-3)

Designed for thesis option students. The course requires completion of thesis research. Prerequisite: departmental approval. May be repeated for maximum of 10 semester hours.

MEEN 5313 Numerical Methods in Mech Engi 3 SCH (3-0)

Numerical methods for advanced analysis and design applications in Mechanical Engineering. Prerequisite: MATH 5372. (Credit may not be obtained in both MEEN 5313 and CEEN 5313.)

MEEN 5314 Finite Element Methods in Engi 3 SCH (3-0)

Principles and applications of the Finite Element Method: energy based variational principle methods, the principles of virtual work, weighted residual methods. Emphasis on structural and nonstructural elements and applications. Prerequisite: CSEN 2304 or equivalent.

MEEN 5315 Advanced Mechanism Design 3 SCH (3-0)

Mobility analysis and rotatability criteria. Vector and matrix based mechanism analysis and synthesis. Motion analysis and simulation of mechanisms. Planar, spherical and spatial mechanisms. Mechanisms for path, function and motion generations. Cam and gear mechanisms. Prerequisite: engineering graduate standing.

MEEN 5316 Mechanics Composite Materials 3 SCH (3-0)

Constituent and application of composite materials, mechanical properties of composite materials using micro-and macro-mechanics perspectives, classical theory, failure theories, manufacturing techniques and experimental testing procedures. Prerequisites: MEEN 3344 and CEEN 3311 or equivalent.

MEEN 5318 Advanced Dynamics 3 SCH (3-0)

Equations of motion in three dimensions. Derivation and application of Lagrange's equations. Vibrations of mechanical systems. Orbital mechanics. Prerequisite: MEEN 3355.

MEEN 5320 Theory of Elasticity 3 SCH (3-0)

Discussion of the concept of stress, strain, deformations, strain compatibility and constitutive relations; formulation and solution of extension, bending, torsion and two-dimensional elasticity problems. (Credit may not be obtained in both MEEN 5320 and CEEN 5310.)

MEEN 5321 Advanced Fluid Mechanics 3 SCH (3-0)

Equations of fluid mechanics: equations of continuity, motion, Navier-Stokes, energy and Bernoulli. Incompressible, laminar, turbulent and compressible flows.

MEEN 5322 Turbulent Flow 3 SCH (3-0)

Stationary random functions. Correlation tensors. Wave number Space. Mechanics of turbulence. Energy spectrum. Dissipation and energy cascade. Turbulence measurements. Isotropic turbulence. Turbulent transport processes. Mixing and free turbulence. Wall-constrained turbulence.

MEEN 5325 Compu Integrated Manuf Syst 3 SCH (3-0)

Advanced systems concept of Computer Integrated Manufacturing System, definition of manufacturing and its various levels, planning and control of product movement through the production system, successful use of Automation, Robotics, Just-In-Time Manufacturing and Knowledge Based Systems. Prerequisite: MEEN 5303.

MEEN 5326 Control Systems Engineering 3 SCH (3-0)

Analysis and design of controlled, dynamic, linear mechanical, electric, fluid and/or thermal systems; introduction to concepts of stability, controllability, observability and to discrete time, sampled data control systems, optimal control systems and nonlinear control theory. Prerequisite: MEEN 5328.

MEEN 5328 Dynamic Systems Engineering 3 SCH (3-0)

Analysis of dynamic-mechanical, electric, fluid and thermal system elements; modeling, analysis and design of physical, dynamic systems composed of these elements.

MEEN 5330 Continuum Mechanics 3 SCH (3-0)

Presentation of the fundamental laws of physics as applicable to a continuous medium in a unified viewpoint. Material is discussed in terms of Cartesian tensors. Topics covered include: vectors and indicial notation of tensors, tensor operations, stress, strain and deformation of continuous media in Eulerian and Lagrangian descriptions. Applications to solid mechanics, fluid mechanics and thermodynamics are explored.

MEEN 5331 Advance Materials Science 3 SCH (3-0)

Formation of metallic materials, polymers and composite materials, both applications and properties including chemical resistance and mechanical properties such as elasticity, creep and fracture. Prerequisite: MEEN 3344.

MEEN 5333 Polymer Science 3 SCH (3-0)

Structure properties of polymeric materials, polymer-solvent thermodynamics, physical and mechanical properties such as viscosity, glass transition, viscoelasticity, fatigue, creep, toughening principles. Prerequisite: graduate standing in science or engineering with materials science (MEEN 3344) or equivalent taken in undergraduate study.

MEEN 5335 Advnd Robotics and Automation 3 SCH (3-0)

Analysis of methods of design and operation of robots and robotic systems. Kinematics and dynamics of manipulators, trajectory planning and motion control, sensing and vision, discussion of command languages and planning of job assignments.

MEEN 5337 Engin Analysis in Applied Mech 3 SCH (3-0)

Simultaneous Equations - Equilibrium, Eigenvalues and Eigenvectors; Extreme Values of Functions; Calculus of Variations; Extremum Principles of Thermodynamics; Stationarity and Extremum Principles of Solid Mechanics; Equations of Motion and the Stationarity Principles of Lagrange and Hamilton. Prerequisites: graduate standing and approval of instructor.

MEEN 5339 Comp Aided Geometric Design 3 SCH (3-0)

Introduction of affine maps, barycentric coordinates, piecewise linear interpolation, tessellation and triangulation. Bezier and B-Spline curves and surfaces. Techniques for constructing curves, surfaces and solids.

MEEN 5341 Tribology: Friction Wear & Lub 3 SCH (3-0)

Surface properties and surface topography, contact mechanics, friction of surfaces in contact, heat dissipation, lubrication, wear and surface damages, surface engineering. Prerequisite: graduate standing in engineering with machine design (MEEN 4351) or equivalent course taken in undergraduate study.

MEEN 5345 Cond and Convection Heat Trans 3 SCH (3-0)

Theory of steady-state and transient heat conduction and theory of convective transport combined with boundary layer theory. Prerequisite: MEEN 3348.

MEEN 5347 Advanced Thermodynamics 3 SCH (3-0)

The equations of state for various systems are given extensive treatment. Prerequisite: MEEN 3347.

MEEN 5348 Auto. Sys. and Ind. Controls 3 SCH (3-0)

Industrial Control Systems, Hardware Components of Automation and Process Controls, Instrument Calibration, Programmable Logic Controllers, PLC interfacing, Computer Numerical Control, Automated Machine Systems, Industrial Networking.

MEEN 5349 Mechanical Vibrations 3 SCH (3-0)

Free and Forced Vibration of Single/Multi Degree of Freedom Systems, Harmonic Excitation, Vibration of Continuous Systems, Vibration Control, Nonlinear and Random Vibrations.

MEEN 5359 Advanced Manufacturing Processes 3 SCH (2-3)

Development of advanced processes and detailed selection criteria for manufacturing processes, processing of castings, additive manufacturing, sheet metal working, polymer and polymer-matrix composites production, machining and laser cutting processes. Prerequisites: MEEN 1310 or equivalent, MEEN 3344 or equivalent.

MEEN 5385 Advanced Manufacturing of Composites 3 SCH (2-3)

Advanced development of composites manufacturing processes; hand lay-up, air and oven curing, 3D printing/ additive manufacturing of composites, filament winding and compression molding. In-depth materials selection and fabrication of marine, aerospace, chemical and civil structures. Practical case studies and individual projects. Prerequisites: MEEN 3344 or equivalent and CEEN 3311 or equivalent.

Master of Science (M.S.) in Industrial Engineering

Master of Science in Industrial Engineering - Thesis Option I

Code	Title	Semester Credit Hours
Core Requirements		6
IEEN 5321	Computer Appl of Stats Methods	3
IEEN 5335	Principles of Optimization	3
In addition to the above, the course below must be taken twice for a total of six (6) semester credit hours		6
IEEN 5306	Thesis	
Industrial Engineering Elective Courses		12

Engineering Elective Courses	6
TOTAL	30
	Credits

Master of Science in Industrial Engineering - Project Option II

Code	Title	Semester Credit Hours
Core Requirements		6
IEEN 5321	Computer Appl of Stats Methods	3
IEEN 5335	Principles of Optimization	3
In addition to the above		
IEEN 5305	Graduate Research Project	3
Industrial Engineering Elective Courses		21
Engineering Elective Courses		6
TOTAL		36
		Credits

Master of Science in Industrial Engineering - Course Option III

Code	Title	Semester Credit Hours
Core Requirements		6
IEEN 5321	Computer Appl of Stats Methods	3
IEEN 5335	Principles of Optimization	3
Industrial Engineering Elective Courses		24
Engineering Elective Courses		6
TOTAL		36
		Credits

Master of Science (M.S.) in Mechanical Engineering

Master of Science in Mechanical Engineering - Thesis Option I

Code	Title	Semester Credit Hours
Core Requirements		12
MEEN 5330	Continuum Mechanics	
MEEN 5321	Advanced Fluid Mechanics	
MEEN 5318	Advanced Dynamics	
MEEN 5337	Engin Analysis in Applied Mech	
In addition to the above, the course below must be taken twice for a total of six (6) semester credit hours		
MEEN 5306	Thesis	
Elective Courses		12
TOTAL		30
		Credits

Master of Science in Mechanical Engineering - Project Option II

Code	Title	Semester Credit Hours
Core Requirements		12
MEEN 5330	Continuum Mechanics	
MEEN 5318	Advanced Dynamics	

MEEN 5337	Engin Analysis in Applied Mech	
MEEN 5321	Advanced Fluid Mechanics	
In addition to the above		
MEEN 5305	Graduate Research Project	3
Elective Courses		21
TOTAL		36

Master of Science in Mechanical Engineering - Course Option III

Code	Title	Semester Credit Hours
Core Requirements		12
MEEN 5330	Continuum Mechanics	
MEEN 5321	Advanced Fluid Mechanics	
MEEN 5318	Advanced Dynamics	
MEEN 5337	Engin Analysis in Applied Mech	
Elective Courses		24
TOTAL		36
		Credits

Mechanical Engineering Elective Courses

Code	Title	Semester Credit Hours
MEEN 5301	Advanced Probs in Mech Eng	1-4
MEEN 5303	Advanced Topics in Mech Eng	1-3
MEEN 5313	Numerical Methods in Mech Engi	3
MEEN 5314	Finite Element Methods in Engi	3
MEEN 5315	Advanced Mechanism Design	3
MEEN 5316	Mechanics Composite Materials	3
MEEN 5320	Theory of Elasticity	3
MEEN 5322	Turbulent Flow	3
MEEN 5325	Compu Integrated Manuf Syst	3
MEEN 5326	Control Systems Engineering	3
MEEN 5328	Dynamic Systems Engineering	3
MEEN 5331	Advance Materials Science	3
MEEN 5333	Polymer Science	3
MEEN 5335	Advnd Robotics and Automation	3
MEEN 5339	Comp Aided Geometric Design	3
MEEN 5341	Tribology: Friction Wear & Lub	3
MEEN 5347	Advanced Thermodynamics	3
MEEN 5348	Auto. Sys. and Ind. Controls	3
MEEN 5349	Mechanical Vibrations	3
MHEN 5372	Sensors & Actuators Mechatron	3

Master of Science (M.S.) in Mechatronics Engineering

Master of Science in Mechatronics Engineering - Thesis Option I

Code	Title	Semester Credit Hours
Course Requirements		12
MHEN 5370	Adv Eng Analysis	
MHEN 5371	Mechatronic Systems	

MHEN 5372	Sensors & Actuators Mechatron	
MHEN 5373	Embedded Mechatronic Sys ¹	
In addition to the above, the course below must be taken twice for a total of six (6) semester credit hours		
MHEN 5306	Thesis Research	
Elective Courses		12
TOTAL		30
		Credits

¹ With the prerequisite of CSEN 2304, MEEN 1320, or equivalent.

Master of Science in Mechatronics Engineering - Project Option II

Code	Title	Semester Credit Hours
Core Requirements		12
MHEN 5370	Adv Eng Analysis	
MHEN 5371	Mechatronic Systems	
MHEN 5372	Sensors & Actuators Mechatron	
MHEN 5373	Embedded Mechatronic Sys ¹	
In addition to the above		
EEEN 5305	Graduate Research Project	3
or MEEN 5305	Graduate Research Project	
or CSEN 5305	Graduate Research Project	
Elective Courses		21
TOTAL		36
		Credits

¹ With the prerequisite of CSEN 2304, MEEN 1320, or equivalent.

Prescribed Elective Courses

Code	Title	Semester Credit Hours
MHEN 5374	Advanced Control Techniques	3
CSEN 5323	Computer Comm Networks	3
EEEN 5303	Advanced Topics in Elec Eng	1-3
EEEN 5338	Digital and DSP Based Control	3
MEEN 5328	Dynamic Systems Engineering	3
MEEN 5335	Advnd Robotics and Automation	3
MEEN 5301	Advanced Probs in Mech Eng	1-4
MEEN 5349	Mechanical Vibrations	3
Other Elective Courses		
CSEN 5333	Real Time Systems	3
EEEN 5329	Adaptive Control	3
EEEN 5342	Wireless Communications	3
EEEN 5331	Digital Signal Processing	3
MEEN 5348	Auto. Sys. and Ind. Controls	3
MEEN 5303	Advanced Topics in Mech Eng	1-3
MEEN 5315	Advanced Mechanism Design	3
MEEN 5314	Finite Element Methods in Engi	3

Engineering Project Management, Professional Certificate

The department offers a graduate level Engineering Project Management Professional Certificate. The graduate level transcribed Engineering Project Management Certificate is a 9-hour program open to all majors and professionals. This certificate will give graduate students the opportunity to learn both engineering technical knowledge and project management skills. Students who earn this certificate will be able to provide technical oversight and coordination of project engineering work; monitor progress against project schedules and budgets; recommend allocation of resources as required to accomplish goals. Contact the department for information and advising. Upon completing this certificate, students and professionals are able to:

- Provide technical oversight and coordination of project engineering work
- Monitor progress against project schedules and budgets
- Recommend allocation of resources as required to accomplish goals

This certificate is open to all majors and professionals. Students will receive the certificate upon completing all courses (*B* or better) stated on course requirements.

Admission Requirements

- A four-year degree in Engineering or closely related field, or
- Students satisfying concurrent enrollment criteria of Texas A&M University-Kingsville graduate classes.

Course Requirements

In order to get the certificate, students need to complete three courses (9 credit hours with a *B* or above grade including IEEN 5327, IEEN 5329 and one of IEEN 5303 and IMEN 5315. The courses may be counted to students' major degree plan **only** with the approval from their major graduate coordinator.

Manufacturing Standards and Standardization, Certificate

The department offers a graduate level Manufacturing Standards and Standardization Certificate program. The graduate level transcribed Manufacturing Standards and Standardization Certificate program is a 9-hour program open to all major graduate students and professional who meet with the admission requirements below. This certificate will give graduate students and professional an opportunity to learn both standards and standardization concepts and skills. The objective of this certificate program to promote standards and standardization concepts and increase students' awareness of the importance of standards and standardization by introducing knowledge related to the creation, modification, interpretation of standards and standardization in manufacturing field. Upon completing this certificate, students and professionals are able to

- Develop critical thinking towards standards and standardization concepts
- Identify and interpret different standards in manufacturing
- Provide technical oversight and coordination to ensure manufacturing process meet national and international standards

This certificate is open to all majors and professional. Students will receive the certificate upon completing all courses state on course requirements with *B* or above grade.

Admission Requirements:

- A four-year degree in Engineering or closely related fields, and at least four years industrial working experience, or
- Students satisfying concurrent enrollment criteria at TAMUK graduate classes.

Course Requirements:

In order to get the certificate, students need to complete three of the following courses (9 credit hours) with *A* or *B* grades,

Code	Title	Semester Credit Hours
IEEN 5332	Mfg System Design	3
IEEN 5333	Six Sigma and ISO Standards	3
Select one of the following:		3
IEEN 5303	Advance Topics in Indus Eng ¹	
MEEN 5301	Advanced Probs in Mech Eng ²	
Total Semester Credit Hours		9

¹ Topic: Standards and Standardization in Manufacturing

² Topic: Advanced Manufacturing

And submit request form to Mechanical and Industrial Engineering Department (Dr. Hua Li, hua.li@tamuk.edu, 361-593-4057). The courses may be counted in students' major degree plan **only** with the approval from their major graduate coordinators.

Standards for Material Testing, Characterization and Applications, Transcribed Certificate

A transcribed certificate on standards for material testing, characterization and applications is offered. To fulfill the requirements for this certificate, the student must attend 6 different on-hour seminars, offered through the certificate program, on standards and standardization methods for material testing and characterization, and their appropriate usage in standard engineering design. In addition, the student must complete 9 credits (3 courses) from the following list of courses with a grade of "B" or better in each, along with a MS Thesis that has significant components on standards (verified by the thesis supervisor and certificate program director), to fulfill the requirements for this certificate.

MEEN 5301 - Advanced Manufacturing; MEEN 5303 - Advanced Manufacturing of Composites; MEEN 5306 - Thesis (maximum 3 Credits can be counted towards the certificate); MEEN 5331 - Advanced Materials Science; MEEN 5333 - Polymer Science; CEEN 5306 - Thesis (maximum 3 Credits can be counted towards the certificate); CEEN 5311 - Advanced Reinforced Concrete Design; CEEN 5316 - Engineering Mechanics of Fiber Composites; CEEN 5361 - Advanced Structural Steel Design.