Courses Description

College: Engineering

Department: Mechanical Engineering

Couse ID: 402771	**Description:** Stress Analysis and Fracture Mechanics

Full Course Description: Stress analysis, strengthening of materials, plastic deformation, stress concentration at the edge pores, crack driving mechanism, propagation criteria, fracture toughness, crack growth in compression, fracture control, fatigue crack growth, environmental cracking, fatigue elastic plastic fracture mechanism, creep.

Couse ID: 402772	**Description:** Composite Materials in NDE

Full Course Description: .

Couse ID: 402773	**Description:** Corrosion Evaluation

Full Course Description:

Couse ID: 402774	**Description:** Computational Methods in NDE

Full Course Description:

Couse ID: 402799	**Description:** Thesis

Full Course Description:

Couse ID: 30402799	**Description:** Thesis

Full Course Description: Master thesis must be completed in Mechanical Engineering fields with six credit hours.

Couse ID: 60402799	**Description:** Thesis

Full Course Description: Master thesis must be completed in Mechanical Engineering fields with six credit hours.

Couse ID: 90402799	**Description:** Thesis

Full Course Description: Master thesis must be completed in Mechanical Engineering fields with six credit hours.

Couse ID: 120402701	**Description:** Engineering Analysis

Full Course Description: Solutions of ordinary and partial differential equations, application of Fourier series and transforms, orthogonal functions, method of separation of variables Bessel functions, Laplace transforms, power series methods, Green functions, linear analysis, vector calculus, conformal mapping techniques.

Couse ID: 120402702	**Description:** Computational Methods for Mechanical Engineering

Full Course Description: This course is focused on computational methods for solving ordinary and partial differential equations. Numerical solutions for ordinary differential equations, Initial value, and boundary value problems. Linear, nonlinear, and stiff ordinary differential equations. Runge-Kutta methods, multi-step methods, corrector-predictor methods, adaptive methods, shooting methods. Finite difference methods. Numerical solutions for partial differential equations. Finite difference methods for elliptic, parabolic, and hyperbolic partial differential equations. Including, Neumann's and Dirichlet, regular and irregular boundary conditions. Explicit methods, implicit methods, Crank-Nicolson method, alternating direction implicit method (ADI), Multi-dimensional problems.

Couse ID: 120402721	**Description:** Advanced Thermodynamics

Full Course Description: Principles of kinetic theory, classical and statistical mechanics applied to thermodynamic systems, statistical interpretation of equilibrium state and thermodynamics of engineering systems. Legendre transformation and thermodynamic potentials. Maxwell relations, stability of thermodynamic systems, introduction to irreversible thermodynamics.

Courses Description

College: Engineering

Department: Mechanical Engineering

Couse ID: 120402722	**Description:** Advanced Heat Transfer

Full Course Description: Formulation of conductive and convective heat transfer equations and boundary conditions for of linear and nonlinear heat transfer problems. Conduction topics include: conduction with energy generation, conduction in non-stationary systems, phase transformation. Convective heat transfer topics include: conservation equations for mass, momentum and energy, boundary layer approximations, laminar and turbulent convection heat transfer, exact and approximate solution techniques and numerical techniques for solving convective heat transfer problems. Introduction to radiation.

Couse ID: 120402723	**Description:** Power Plant Technology

Full Course Description: World power statistics, Load demand, Economics of power production, Series impedance of Transmission Lines, capacitance of transmission lines, Current and voltage Relations on a transmission line, System modeling. Network calculations, Load-flow Solutions and control, Power plants thermodynamics, Components of Rankine power plants, Heat transfer in boiler components, Two phase flow calculations, Air circulation, Stack design, Steam turbine design, Gas turbines, Diesel generators, Combined systems, Co-generation systems.

Couse ID: 120402732	**Description:** Micro-Electromechanical Systems

Full Course Description: Introduction to Nanotechnology, Microtechnology and MEMS, applications and markets, scaling of micromechanical devices, mechanical properties of MEMS materials, Silicon material systems, flow physics, liquid flows in microchannels, molecular-based microfluidic simulation models, fundamentals of control theory, model-based flow control for distributed architectures, soft computing in control, materials for microelectromechanical systems, MEMS fabrication, LIGA and other replication techniques, x-ray based fabrication, packaging MEMS, Application of MEMS.

Couse ID: 120402733	**Description:** Advanced Measurements

Full Course Description: Generalized performance characteristics of instruments, principles of electromechanical transducers, study of circuit and recording instrument characteristics, introduction to digital data systems, data acquisition systems, and applications to measurement of quantities such as strain, force, temperature, flow, acceleration, and others, Non testing destructive for Mechanical Engineering.

Couse ID: 120402761	**Description:** Energy Mamagement

Full Course Description: The Issue of Energy, Energy Crisis, Energy system analysis, Energy Conservation Measures, Methods of evaluating system efficiency, Conducting energy audits, Energy accounting and analysis, Maintenance and energy audits, Self-evaluation checklists, Life cycle analysis, Energy economics, Reporting and controlling, computer software of energy management, Case studies.

Couse ID: 120402762	**Description:** Solar Energy Engineering

Full Course Description: Solar angles, Solar radiation measurements and calculations, Design of low and moderate temperature Solar water heaters, Solar assisted heat pump, High temperature solar concentrators and receivers, Solar electric generation systems, Industrial solar water heating, Thermal storage simulation, Solar tracking techniques, Solar desalination systems, Photovoltaic (solar cell) performance, Photovoltaic systems, Off grid and grid connected PV systems, Storage battery, Long term performance of solar systems, Economics of solar energy engineering.

Couse ID: 120402763	**Description:** Energy & Environment

Full Course Description: power generation and energy utilization on ecology and climate, Transport of pollutants in air, water and ground, Emission control technologies, Hazardous waste management, Recycling, Global and regional energy situation and scenarios for the future, Sustainable development issues, Environmental legislation, Development of environmental standards, Environmental accounting and reporting, Environmental ethics, Environmental impact assessment, Case studies.

Courses Description

College: Engineering

Department: Mechanical Engineering

Couse ID: 120402764	**Description:** Renewable Energy Technology

Full Course Description: Solar thermal systems, PV systems, oil shale, Biomass technology, Fuel cells, Hydroelectricity, Tidal power, Wind energy, Wave energy, geothermal energy, Integration of renewable energy systems, Economics of renewable energy systems.

Couse ID: 120402795	**Description:** Seminar

Full Course Description: Presentations given by students, professors, and invited speaker, term paper must be presented by students.

Couse ID: 120402799	**Description:** Thesis

Full Course Description: Master thesis must be completed in Mechanical Engineering fields with six credit hours.