

## Courses Description

**College:** Engineering

**Department:** Mechanical Engineering

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**Course ID:** 402549      **Description:** Computer Aided Design

**Full Course Description:** a

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**Course ID:** 402551      **Description:** HVAC

**Full Course Description:** a

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**Course ID:** 402552      **Description:** Building Services

**Full Course Description:** a

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**Course ID:** 402553      **Description:** Refrigeration Systems

**Full Course Description:** a

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**Course ID:** 402554      **Description:** Design of Thermal Systems

**Full Course Description:** a

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**Course ID:** 402561      **Description:** Internal Combustion Engines

**Full Course Description:** a

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**Course ID:** 402562      **Description:** Energy Conservation

**Full Course Description:** a

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**Course ID:** 402564      **Description:** Renewable Energy

**Full Course Description:** a

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**Course ID:** 402571      **Description:** Special Topics in Mechanical Engineering

**Full Course Description:** a

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**Course ID:** 402599      **Description:** Practical Training

**Full Course Description:** a

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**Course ID:** 2402303      **Description:** Engineering Numerical Methods

**Full Course Description:** a

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**Course ID:** 2402313      **Description:** Fluid Mechanics Lab.

**Full Course Description:** a

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**Course ID:** 2402450      **Description:** Mechanical and Electrical Systems for Architectural Students

**Full Course Description:** a

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**Course ID:** 4402212      **Description:** Strength of Materials Lab.

**Full Course Description:**

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**Course ID:** 4402223      **Description:** Thermodynamics Lab.

**Full Course Description:**

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**Course ID:** 4402313      **Description:** Fluid Mrchanics Lab.

**Full Course Description:**

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**Course ID:** 4402322      **Description:** Heat Transfer Lab.

**Full Course Description:**

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**Course ID:** 4402323      **Description:** HVAC

**Full Course Description:**

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**Course ID:** 4402332      **Description:** Energy Conservation

**Full Course Description:**

## Courses Description

**College:** Engineering

**Department:** Mechanical Engineering

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**Course ID:** 4402343      **Description:** Machine Design (2)

**Full Course Description:**

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**Course ID:** 4402352      **Description:** Building Survaces

**Full Course Description:**

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**Course ID:** 4402415      **Description:** Process Control Systems

**Full Course Description:**

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**Course ID:** 4402443      **Description:** Finite Element Methods

**Full Course Description:**

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**Course ID:** 4402495      **Description:** Special Topics

**Full Course Description:**

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**Course ID:** 110402231      **Description:** Dynamics

**Full Course Description:** Kinematics of particles, rectilinear and curvilinear motion in various coordinate systems, kinetics of particles, Newton's laws, central force motion, work-energy equation, principle of impulse and momentum, impact, conservation of energy and momentum, kinematics of rigid bodies, relative velocity and acceleration, instantaneous center, plane kinetics of rigid.

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**Course ID:** 110402310      **Description:** Fluid Mechanics (1)

**Full Course Description:** Flow classification, fluid properties, viscosity, vapor pressure, fluid statics, pressure measurements, buoyancy, fluids in motion, continuity equation, pressure gradient in fluid flow, Bernolli's, momentum and energy equations, dimensional analysis and similitude, and flow in conduits.□

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**Course ID:** 110402313      **Description:** Fluid Mechanics Lab

**Full Course Description:** Experimental methods and measurements: fluid properties, orifice and jet flow, Bernoulli's theorem-flow through a venture tube, impact of water jet, losses in pipes and fittings, comparative fluid measurements, hydrostatic pressure, flow visualizations and turbulent pipe flow, performance of pumps.

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**Course ID:** 110402434      **Description:** Control Systems

**Full Course Description:** a

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**Course ID:** 110402448      **Description:** Dynamics of Machinery

**Full Course Description:** a

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**Course ID:** 110402450      **Description:** Mechanical and Electrical Systems for Architectural Students

**Full Course Description:** 1

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**Course ID:** 110402481      **Description:** Thermofluids

**Full Course Description:** 1

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**Course ID:** 110402482      **Description:** Thermofluids Lab.

**Full Course Description:** 1

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**Course ID:** 110402514      **Description:** Fluid Mechanics (2)

**Full Course Description:** a

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**Course ID:** 110402527      **Description:** Heat Transfer (2)

**Full Course Description:**  
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## Courses Description

**College:** Engineering

**Department:** Mechanical Engineering

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**Course ID:** 110402531      **Description:** Finite Elements Methods for Machine Design

**Full Course Description:** Introduction to approximate solution methods for problems in elasticity; the RITZ method; interpolation; weighted residual methods; applications of the finite element method; isoparametric finite elements; displacement-based bending elements in solid and structural mechanics; programming the finite element method; advanced topics in finite element analysis.

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**Course ID:** 110402535      **Description:** Vibration and Control Lab

**Full Course Description:** a

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**Course ID:** 110402538      **Description:** Introduction to Nondestructive Testing Techniques

**Full Course Description:** Overview of nondestructive testing, Overview of manufacturing processes, Introduction to welding technology, Defectology, Liquid Penetrant Testing (technique, methods, equipment, interpretation and evaluation of indications, standards and practices), Magnetic Particles Testing (principles, magnetization and demagnetization methods, equipment, evaluation techniques, standards and practices), Ultrasonic Testing (principles of acoustics and ultrasonics, methods and applications, equipment and probes, calibration, interpretation and evaluation, standards and practices), Radiographic Testing (principles, methods, equipment, safety, image interpretation, standards and practices).

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**Course ID:** 110402549      **Description:** Computer Aided Design

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**Course ID:** 110402564      **Description:** Renewable Energy

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**Course ID:** 110402571      **Description:** Special Topics in Mechanical Engineering

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**Course ID:** 110402599      **Description:** Practical Training

**Full Course Description:** a

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**Course ID:** 150402599      **Description:** Practical Training

**Full Course Description:** A

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**Course ID:** 2004021599      **Description:** Practical Training

**Full Course Description:** Getting a bachelor's degree in Mechanical Engineering requires practical training for a period of eight (8) weeks in any private or public organizations inside or outside Jordan that work in the area of Mechanical Engineering and had been approved by the department of Mechanical Engineering and the Faculty of Engineering.

## Courses Description

**College:** Engineering

**Department:** Mechanical Engineering

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**Course ID:** 2104021230      **Description:** Strength of Materials (1)

**Full Course Description:** Types of loads, structures and supports, axial stress and strain, normal and bending moment diagrams, torsion, bending of beams, compound stresses, combined stresses, shearing stress and strain, Mohr's circle of stress and strain, thin walled pressure vessels, deflection of simple beams, buckling of columns.

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**Course ID:** 2104021241      **Description:** Mechanical Drawing

**Full Course Description:** Mechanical engineering drawing conventions and abbreviations, types of sectional views, development of surfaces, using CAD software to make solid modeling and understand the philosophy of three-dimensional modeling. Construct sectional and auxiliary views working with intersections of planes and surfaces and understand the steps necessary to produce production drawings from a three dimensional model. Develop and understand acceptable dimensioning and tolerance practices used in production. Assembly, modeling of mechanisms using CAD software, the involute curve, drafting a gear, drawing screws and nuts according to different threading types, fasteners and springs.

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**Course ID:** 2104021321      **Description:** Thermodynamics (1)

**Full Course Description:** Thermodynamics properties; states, processes and cycles; closed and open systems; work and heat, ideal and real gases; conservation of mass; 1st and 2nd laws of thermodynamics; entropy; exergy.

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**Course ID:** 2104021322      **Description:** Thermodynamics (2)

**Full Course Description:** Review of basic laws and principles, vapor, air power and refrigeration cycles, mixtures of gas and vapor, psychrometry, combustion, enthalpy of formation, heat of reaction, compressible flow, velocity of sound Mach number, normal shock waves, nozzle and diffuser flows.

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**Course ID:** 2104021330      **Description:** Strength of Materials Lab

**Full Course Description:** Measuring and/or determination of some material properties such as stress (yield, ultimate & fracture) and strain, torsion, impact, fatigue, bending, creep, hardness and tensile tests.

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**Course ID:** 2104021332      **Description:** Manufacturing Processes

**Full Course Description:** It explores the technology behind different types of manufacturing operations, and the proper application of processes and techniques to transform raw materials into components, and components into assemblies. It focuses on the methods used in the manufacturing and processing of metals, plastics and composites including material removal, bulk deformation, hot and cold forming, casting and molding. It also discusses the products surface qualities and properties according to the manufacturing process utilized. The course covers casting of metals and alloys, rolling, forging, extrusion, drawing, cutting, bending, and drawing of sheet metal, traditional, shear process machining (turning, drilling, milling, cutting tools, chip type machining processes), nontraditional machining (like laser, electron beam, water jet) and contemporary topics such as rapid manufacturing, manufacturing of polymers and reinforced plastics.

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**Course ID:** 2104021341      **Description:** Machine Design (1)

**Full Course Description:** Evaluation and considerations of design process, static strength and theories of failure, fatigue strength, fatigue theories of failure, design of fasteners and connections, riveted joints, bolts and screws, force-deflection diagrams of bolted connections, welded joints.

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**Course ID:** 2104021342      **Description:** Theory of Machines

**Full Course Description:** Mechanisms and applications, mobility and linkages, cams, spur gears, helical and bevel gears, worm gears and Gear trains. Velocity analysis of mechanisms, Acceleration analysis of machinery, Static force analysis, dynamic force analysis, balancing of rotors and reciprocating engines, synthesis of mechanisms. Term project.

## Courses Description

**College:** Engineering

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**Course ID:** 2104021401      **Description:** Engineering Measurements

**Full Course Description:** Introduction to measurement systems and experimental methods, basic concepts, calibration, dynamic response, analysis of experimental data, basic electrical measurements and sensing devices, displacement and area measurements, pressure measurement, flow measurement, temperature measurement, force, torque and strain measurements.

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**Course ID:** 2104021411      **Description:** Turbo-machinery

**Full Course Description:** Classification of turbomachines, dimensional analysis and similarity laws, pressure and temperature isentropic relations for compressible flow, total pressure and temperature relations, energy transfer between rotating rotors and fluid flow, degree of reaction, construction of velocity diagrams, analyses of axial and radial flow compressors and turbines, free vortex design, estimation of stage and design point performance.

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**Course ID:** 2104021412      **Description:** Fluid power system

**Full Course Description:** The course covers the fundamentals of fluid power systems (hydraulic and pneumatic) and its components. Fluid power modulation, static and dynamic modeling of pumps, motor, control valves, transmission lines, and fluid drives. It also deals with design control and operation of mechanical and electrical hydraulic servo-drives with feedback. Emphasis on circuit design, symbols, schematic diagrams, and hydraulic systems behavior.

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**Course ID:** 2104021421      **Description:** Heat Transfer

**Full Course Description:** Introduction to heat transfer mechanisms, heat conduction equation, steady heat conduction including the thermal resistance networks, transient heat conduction, lumped systems, fundamental of convection and thermal boundary layers, external and internal forced convection, natural convection, boiling and condensation, thermal radiation, and heat exchangers.

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**Course ID:** 2104021422      **Description:** Thermal Science Lab (1)

**Full Course Description:** Marcet Boiler, Gas Calorific Value, Nozzle Test, Refrigeration Cycle., Stiring Cycle, 6-two-stage compressor, Thermal Resistance Of multilayer materials, Double-pipe concentric tube heat exchanger, Cross-flow heat exchanger, combined convection and Radiation, forced convection and radiation.

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**Course ID:** 2104021431      **Description:** Mechanical Vibrations

**Full Course Description:** Linear Spring-mass-damper modeling, Single and Multi-Degree Degree of Freedom systems, Newton's Methods, Energy and Lagrange methods, Hysteretic Damping, Coulomb Friction Damping, Free and Forced Response, Harmonic, Periodic and Arbitrary Forced Excitation Response, Modal analysis and Mode summation techniques, Basic Principles of Vibrations Measurements, Design of Vibration Isolators, Continuous systems.

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**Course ID:** 2104021433      **Description:** Composite Materials

**Full Course Description:** Classification and characterization of composite materials, basic terminology of laminated fiber reinforced composite material, manufacturing methods, testing for mechanical properties, non-destructive inspection, macro-behavior of lamina, stress- strain relations for anisotropic material, orthotropic materials, invariant properties and strength of orthotropic lamina , biaxial strength theories for orthotropic lamina, micro behavior of lamina, mechanics of material and elasticity approaches to stiffness, mechanics of material approach to strength.

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**Course ID:** 2104021441      **Description:** Machine Design (2)

**Full Course Description:** Mechanical springs: helical, leaf and torsion springs shafts, rolling element bearings. Lubrication and journal bearings, clutches, coupling and brakes, gears and geometry, gear trains force and stress, multi-speed gear boxes design and analysis, couplings, clutches, brakes and fly wheels, cams, belts and chains, and term project.

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**College:** Engineering

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**Course ID:** 2104021451      **Description:** Automotive Technology

**Full Course Description:** Automobile Overview, engine systems (ignition, fuel, lubrication, cooling), spark ignition and compression ignition engine types, design and operating parameters of engines, combustion, engine cycles, combustion chamber design, Octane and Cetane numbers, air induction systems and volumetric efficiency, fuel injection systems, exhaust systems, engine emissions and air pollutions, automobile systems (power terrain, brakes, steering, suspension, air-conditioning and heating), wheels and tires, common malfunctions and remedies, basic hand tools, engine maintenance, automobile up to date technologies, modern automobile mechanical, electrical, control and electronic systems, engine control unit (ECU), sensors technologies, electrical vehicles, hybrid vehicles.

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**Course ID:** 2104021452      **Description:** Design of Thermal Systems

**Full Course Description:** Designing of a workable thermal system, modeling of thermal equipment, system simulation and optimization, thermodynamic properties, and steady-state simulation of large systems.

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**Course ID:** 2104021461      **Description:** Energy Conservation

**Full Course Description:** Basic principles, terminology and concepts of conservation, energy auditing, energy conservation in boilers, furnaces & dryers, energy storage and waste heat recovery, co-generation and combined heat and power systems.

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**Course ID:** 2104021533      **Description:** Strength of Materials (2)

**Full Course Description:** This course covers fundamental theories of stress and strain; Transformations of stress and strain; 2D and 3D Mohr's Circle for stress and strain; Linear Stress-Strain-Temperature relations; Inelastic Material Behavior; Energy Methods and Castigliano Theorems; Flat Plates Theory; Basic Contact and Fracture Mechanics Problems.

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**Course ID:** 2104021534      **Description:** Flight Mechanics

**Full Course Description:** The Standard Atmosphere. Measurement of air data. Air data computers. Equations of motion for performance - the aircraft force system. Lift, drag, and thrust forces. Total airplane drag- estimation, drag reduction methods. The propulsive forces - the thrust production engines, power producing engines, variation of thrust, propulsive power and specific fuel consumption with altitude and flight speed. The minimum drag speed, minimum power speed. Aerodynamic relationships for a parabolic drag polar.

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**Course ID:** 2104021535      **Description:** Green Biomaterials

**Full Course Description:** The importance of green biomaterials in modern industries, the factors that influence their behavior at the macro and micro levels, and the use of natural resources to obtain such sustainable materials. As well as their manufacturing methods, components and physical, chemical and mechanical properties. This course will also study the methods of selecting suitable fibers for various modern engineering applications and the impact of selection processes on design processes to produce environmentally friendly green materials and products to contribute to the development of modern sustainable industries.

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**Course ID:** 2104021541      **Description:** Electromechanical Systems

**Full Course Description:** A study of devices and components that translate electrical energy into mechanical motion. Interfacing of mechanical and electrical systems and mechatronics. Basic introduction to sensors, actuators and computer interfacing and control. Transducers and measurement devices, actuators, A/D and D/A conversion, signal conditioning and filtering. DC and AC motors, servomotors, stepping motors, solenoids, relays, and timers. Applications of sensors and actuators in mechanical systems.

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**Course ID:** 2104021542      **Description:** Engineering Measurements Lab

**Full Course Description:** Experiments in the laboratory include the use of oscilloscope, voltmeters and operational amplifiers to calibrate and measure various mechanical and electrical quantities such as force, torque, temperature, displacement, flow, strain using various types of sensors

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**Couse ID:** 2104021544      **Description:** System Dynamics and Modeling

**Full Course Description:** Developing mathematical models of dynamic systems, including mechanical, electrical, electromechanical, and fluid-thermal systems, and representing these models in transfer function and state space form. Analysis of dynamic system models, including time and frequency responses. Theory of single and multi-degree-of-freedom systems with an introduction to continuous systems. Determination of equations of motion, including natural frequency for free vibration and amplitude of forced vibration. Introduction to linear feedback control techniques. Synthesis and analysis by analytical and computer methods.

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**Couse ID:** 2104021550      **Description:** Thermal Science Lab (2)

**Full Course Description:** Flash point, stroke S.I engine, stroke diesel engine, Emission analysis of, S.I engine, Psychometric process, Air Conditioning reversed cycle, Center heating system, Weather station, Solar collector efficiency, Film and drop wise condensation, Boiling heat transfer.

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**Couse ID:** 2104021551      **Description:** HVAC (Heating, Ventilation and Air-Conditioning)

**Full Course Description:** Review of psychrometry, thermal comfort, air conditioning processes, inside and outside design conditions, heating load calculations, infiltration, cooling load calculations, solar gain, heating systems, design, layout, hot water, steam, hot air systems, under floor heating.

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**Couse ID:** 2104021572      **Description:** Graduation Project (1)

**Full Course Description:** Planning, design, construction and/or management of a mechanical engineering project. Writing a technical report. Preparation of technical engineering drawings

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**Couse ID:** 2104021573      **Description:** Graduation Project (2)

**Full Course Description:** Completion of Graduation Project 1.