course description

Fly to Italy

این فایل به منظور کمک به متقاضیان تحصیل در کشور ایتالیا توسط گروه فلای تو ایتالی به صورت رایگان تهیه شده است لطفا از خرید این فایل خودداری فرمایید.

اسفاده از این فایل در صفحات مجازی و وبسایت ها **با ذکر نام تهییه کننده** بلا مانع است.

معرفی فلای تو ایتالی

سلام ...!
تیم فلای تو ایتالی متشکل از چند دانشجو که فعالیت خودمون را از ماه بهمن سال **1401** آغاز کردیم و هدف تیم ما این است که به شما کمک کنیم تا بتوانید به صورت مستقل و بدون نیاز به مشاوران مهاجرتی برای دانشگاه های ایتالیا اپلای کنید و پذیرش بگیرید . با توجه به اینکه بسیاری از موسسه های مهاجرتی هزینه های بالایی را برای اخذ پذیرش از دانشگاه های ایتالیا از دانشجو دریافت میکنند ، ما تصمیم گرفتیم با تلاش و تجربه خود به دانشجو ها کمک کنیم که بدون هزینه اضافه کار های مهاجرتی خودشون را انجام بدهند .
در این راستا در طی سال های گذشته ویدئو های مختلفی را برای نحوه اپلای کردن دانشگاه های ایتالیا ضبط و منتشر کردیم تا به دانشجویان کمکی کرده باشیم تا بتوانند در این مسیر با کمترین هزینه از دانشگاه های ایتالیا پذیرش بگیرند .

پس اگر سوال یا نیاز به راهنمایی در زمینه مهاجرت تحصیلی به کشور ایتالیا داشتید ، با ما همراه باشید و سوالات خودتون را از ما بپرسید . ما در کنار شما خواهیم بود و شما را همراهی خواهیم کرد .

مدیریت **fly to italy**

طریق استفاده از فایل

برای استفاده از این فایل ، صفحات بعد را کپی گرفته و به دانشگاه مبدا ببرید و تاییدات لازم را بگیرید

Faculty of Mechanical Engineering

Course Description

Bachelor of Science in Mechanical Engineering

Industrial Drawing I (2 credits)

Introduction to graphic language and design — means and techniques. The third and the first angle projections. Orthographic projection of points, lines, planes and solids. Principal and auxiliary views. Views in a given direction. Sectional views. The intersection of lines, planes and solids. Development of surfaces. Drafting practices. Dimensioning, fits and tolerance. Working drawings — detail and assembly drawing. Design practice. Machine elements representation. Training via SOLIDWORKS.

Three hours per week.

Physics: Mechanics and Heat (2 credits)

Fundamentals of physics - analysis of motion and heat transfer Measurement, Motion in two and three dimensions, forces and Newton's laws and its application, momentum, systems of particles, rotational kinetics, rotational dynamics, angular momentum, work and kinetic energy, potential energy, conservation of energy, gravitation, Temperature, molecular properties of gasses, first law of thermodynamics, entropy and second law of thermodynamics.

Three hours per week.

Physics: Mechanics and Heat Laboratory (1 credits)

Experimental view of Physics (Mechanics and Heat) course.

Two hours per week.

Chassis Body Design (3 credits)

Vehicle performance, suspension, steering, and brake systems. Steady state and transient conditions. Relating diagrams, equations of motion, effect of exterior forces on the components.

Four hours per week.

Strength of material I (3 credits)

Stress and deformation. Uniaxial tension test, temperature effects in bars. Torsion of circular shafts. Simple bending of beams and associated deflections, shear stresses in beams. Combined stresses due to bending, torsion, shear and axial loads. Transformation of stress, principal stresses, and Mohr's circle. Introduction to energy principles. Failure criteria. Stability and buckling.

Four hours per week.

Strength of material II (2 credits)

This is Supplementary course for Strength of material I.

Three hours per week.

Computer programming (3 credits)

Introducing organization and main parts of computer, machine language and assembly, numeric and non-numeric data representation, algorithms and sub-algorithms and flowchart, basic concepts such as frequency, familiarity with C Programming language: constants and variables, computational and logical phrases, different types of instructions, different types of conditional operations loops, vectors and matrices, subprograms, input and output instructions, common algorithms such as methods of search and arrangement, practical examples of programming.

Four hours per week.

Dynamics I (3 credits)

This course is an introduction to the dynamic of lumped-parameter models of mechanical systems. Topics covered include kinematics, the force-momentum formulation for systems of particles and rigid bodies in planar motion, work-energy concepts, virtual displacements and virtual work.

Four hours per week.

Dynamics II (2 credits)

Students will become familiar with the following topics: Lagrange's equations for systems of particles and rigid bodies in planar motion, and linearization of equations of motion. After this course, students will be able to evaluate free and forced vibration of linear multi-degree of freedom models of mechanical systems and matrix eigenvalue problems.

Three hours per week.

Fundamentals of electrical engineering I (3 credits)

Production and transmission and distribution of power, industrial power distribution, three-phase power, magnetism and magnetic circuits, magnetic force calculations, the core losses in magnetic circuits, DC electric machines, DC Generators, DC Motors. Principles of work and types of the permanent flow generator, permanent flow generating characteristics, principles and types of permanent flow engines work .synchronized permanent flow engines. Construction of the alternating current generators (alternator), synchronous induction motors, asynchronous induction motors, single phase and three phase motors.

Four hours per week.

Fundamentals of electrical engineering II (3 credits)

This is Supplementary course for Fundamentals of electrical engineering I.

Four hours per week.

Chemistry (3 credits)

Systematic treatment of fundamental chemical and physical principles and their applications to the properties and transformations of materials, including the concept of energy and its uses, gas laws, kinetic molecular theory, laws of chemical combination, atomic and molecular structure, periodic classification of the elements, and chemical bonding.

Four hours per week.

Fundamentals of electrical engineering Laboratory (1 credits)

Special Probability Distributions. Special Probability Densities. Functions of Random Variables. Sampling Distributions. Decision Theory. Point Estimation. Interval Estimation. Hypothesis Testing. Tests of Hypotheses Involving Means, Variances, and Proportions. Regression and Correlation. Analysis of variance. Design and Analysis of Experiments. The experimental view of Fundamentals of electrical engineering I&II.

Two hours per week.

Machine tool workshop (1 credits)

In this course, the student shall learn the method of work with workshop tools and equipment in Machine Tools, and Practical Experience with machine tools with a project. This is designed to provide the student with hands-on knowledge and the practical learning experience in the accident prevention awareness required to perform various tasks utilizing basic power tools such as; power sander, hand drill, and a variety of hand and power tools per outlined in course topics. Then the students will develop hands-on knowledge and the practical learning experience in utilizing the Engine Lathe and component parts per outlined in course topics. The students will also develop knowledge and skill in operating power saws for sawing material to length and drill presses for a variety of drilling operations per outlined in course topics. All students will be required to become proficient in basic measuring tools such as; height measuring systems, calipers, micrometers, surface plates and a variety of measuring tools per outlined in course topics. This course introduces the safe operation of milling machines in the area of vertical milling machines and addresses the various types of milling machines used in industry, their component parts, and associated safety precautions. It also emphasizes the most common milling operations required by multi-skilled industrial maintenance technicians.

Three hours per week.

Calculus I (3 credits)

Topics include a brief review of polynomials, trigonometric, exponential, and logarithmic functions, followed by discussion of limits, derivatives, and applications of differential calculus to real-world problem areas. An introduction to integration concludes the course.

Four hours per week.

Calculus II (3 credits)

Topics include (but are not limited to) the following: limits and continuity; definition of derivative, rate of change, slope; derivatives of polynomial and rational functions; the chain rule; implicit differentiation; approximation by differentials; higher-order derivatives; Rolle's Theorem and mean value theorem; applications of the derivative; antiderivatives; the definite integral; the fundamental theorem of calculus; area, volume, other applications of the integral; the calculus of the trigonometric functions; logarithmic and exponential functions; techniques of integration, including numerical methods, substitution, integration by parts, trigonometric substitution, and partial fractions; indeterminate forms and L'Hôpital's rule; improper integrals; sequences and series, convergence tests, Taylor series; parametric equations; polar coordinates and equations; vectors in 2 and 3 dimensions, vector operations; lines and planes in space; surfaces, quadric surfaces; functions of more than one variable, partial derivatives; the differential, directional derivatives, gradients; double and triple integrals, evaluation and applications; cylindrical and spherical coordinates.

Four hours per week.

Physics: Electricity and magnetism Laboratory (1 credits)

Experimental view of Physics (Electricity and magnetism) course.

Two hours per week.

Physics: Electricity and magnetism (2 credits)

Fundamentals of physics - analysis of magnetics & electricity. Electric charge and Coulomb's law, the electric field, Gauss. law, Electric Potential Energy and Potential, the electric properties of materials, Capacitance and Capacitors, DC Circuits, the magnetic field and magnetic field of a current, Faraday's law of induction, magnetic properties of materials, inductance, AC circuits, Ampere's law.

Three hours per week.

Technical English (2 credits)

Listening comprehension exercises (using films and audio cassettes). Descriptions (in writing) of devices and operational sequences. Oral descriptions of sketches and diagrams. Grammatical structures frequently occurring in technical texts (such as the passive voice) are practiced as required.

Three hours per week.

Welding and sheet metal forming workshop (1 credits)

Workshop of welding and sheet shaping. Safety issues and procedures of welding, different types of welding methods and instruments, and power supplies. Electric arc welding, Creating electric arc, setting the correct electrode gap, and electrode angles, oxidation conditions. Basic weld joints: butt joint, lap joint, corner joint, edge joint, and T-joint. Oxyacetylene welding.

Three hours per week.

Materials Science (3 credits)

Relationships between properties and internal structure, atomic bonding; molecular, crystalline and amorphous structures, crystalline imperfections and mechanisms of structural change. Microstructures and their development from phase diagrams. Structures and mechanical properties of polymers and ceramics. Thermal, optical, and magnetic properties of materials.

Four hours per week.

Thermodynamics I (3 credits)

Basic concepts of systems, properties, conservation of mass, and equilibrium. Property evaluation for ideal gasses. Property evaluation for incompressible substances. Property evaluation for compressible substances. Application of the first law of thermodynamics. Entropy and the second law of thermodynamics. Application of the second law of thermodynamics. Analysis of thermal systems. These principles are applied in subsequent courses to solve problems in the field of steam cycles, internal combustion engines, air compressors and refrigeration.

Four hours per week.

Fluid mechanics Laboratory (1 credits)

Introduction to fluid mechanics laboratory and design of experiments, including experiments on flow patterns, velocity profile in an air pipe, wind tunnel calibration, draining of a tank, pipe friction, drag forces, boundary- layer studies, falling-ball experiments, and measurements of fluid properties.

Two hours per week.

Ordinary differential equations (3 credits)

Fundamentals methods to solve Differential Equations Nature of differential equations and their solution, family of graphs and vertical routes, physical patterns, separable equation, first order linear differential equation, homogeneous equation, second order linear equation, homogeneous equation with fixed constants, method of indefinite constants, method of changing parameters, application of second order equations in physics and mechanics, solution of differential equation with series, Bessel and Gamma functions, Legendre polynomial, an introduction to differential equations set, Laplace transform and its application in solving differential equations.

Four hours per week.

Strength of Material Laboratory (1 credits)

The experimental view of Strength of Material.

Two hours per week.

Thermodynamics II (3 credits)

Brief review of ideal gas processes. Semi-perfect gasses and the gas tables. Mixtures of gasses, gasses and vapors, air conditioning processes. Combustion and combustion equilibrium. Applications of thermodynamics to power production and utilization systems: study of basic and advanced cycles for gas compression, internal combustion engines, power from steam, gas turbine cycles, and refrigeration. Real gasses.

Four hours per week.

Industrial Drawing II (2 credits)

Introduction to engineering design and design process. Problem definition, solution formulation, model development and collaboration aspects of design process. The use of drawings and other graphical methods in the process of engineering design. Industrial standards and specifications, design of fits, linear and geometrical tolerances. Design projects based on design philosophies will involve design and selection of many standard machine components like mechanical drives, cams, clutches, couplings, brakes, seals, fasteners, springs, and bearings. Drawing representation of standard components. Design projects are an integral part of this course. Training via CATIA.

Three hours per week.

Thermodynamics Laboratory (3 credits)

The experimental view of Thermodynamics I&II.

Two hours per week.

Mechanical part design I (3 credits)

Stress and deflection analysis; survey of mechanical design criteria; selection and applications of working stresses for ductile and brittle materials, static, fatigue, and impact loading and combination of stresses.

Four hours per week.

Mechanical part design II (3 credits)

Analysis and design of machine elements, components, and mechanical systems. Machine elements include shafts, keys, bearings, gears, belts, chains, springs, screws, and motors.

Four hours per week.

Engineering Mathematics (3 credits)

Mathematical models are used to understand, predict and optimize engineering systems. Many of these systems are deterministic and are modeled using differential equations. Others are random in nature and are analyzed using probability theory and statistics. This course provides an introduction to differential equations and their solutions and to probability and statistics, and relates the theory to physical systems and simple real world applications. Topics covered are: Ordinary differential equations, including first and second order equations and series solutions; Fourier series; partial differential equations, including the heat equation, the wave equation, Laplace's equation and separation of variables; probability and statistical methods, including sampling and probability, descriptive statistics, random variables and probability distributions, mean and variance, linear combinations of random variables, statistical inference for means and proportions and linear regression.

Four hours per week.

Numerical Methods (2 credits)

Approximations and errors, instability in numerical computations and methods of their prevention. Curve fitting and interpolation: interpolating criteria, least-squares regression, Lagrange interpolating polynomial with one and two variables. Cubic spline interpolation. Newton interpolating polynomial. Taylor approximation. Linear and polynomial regressions. Other common regression curves. Chebyshev approximation (minimax polynomial); Numerical differentiation and integration: Numerical integration by trapezoidal rules and Simpson rules. Gauss-Legendre, Gauss-Chebyshev and Gauss-Hermite quadratures. Romberg method and Richardson extrapolation. Numerical differentiation; Roots of algebraic and transcendent equations: bisection method, substitution method, Newton methods for real and complex variables; Systems of linear algebraic equations: Direct methods (Gauss elimination and LU decomposition). Iterative methods (Jacobi method and Gauss-Seidel method); Solving methods for nonlinear systems: Jacobi method, generalized Newton method, Newton-Rephson method; Mathematical modeling of engineering problems: physical system, classification of problems, system analysis (topological modeling, systems with consented parameters and types of equations, systems with distributed parameters and types of equations); Integration of first-order Ordinary Differential Equation(ODE) with initial condition using Runge-Kutta methods of 1st to 4th order. Predictor-corrector methods. Runge-Kutta methods for first order ODE systems. Finite difference method for ODE with boundary conditions; Numerical solving of elliptic equations, and parabolic equations.

Three hours per week.

Rotary Machine Design (3 credits)

Thermodynamics, gas dynamics, and fluid mechanics of axial and centrifugal compressors, pumps, and turbines. Selection of components for engineering applications. Design problems and/or laboratory experiments to illustrate operating characteristics of turbo machines.

Four hours per week.

Special project (3 credits)

This course is a means for the student to show his/her ability to integrate all knowledge and skills acquired by designing or improving integrated system. Each student will be assigned any one of the following types of project/thesis work:

(a) Industrial case study

(b) Preparation of a feasibility report

(c) Thesis by experimental research, and

(d) Design and development of equipment.

Four hours per week.

Heat Transfer I (3 credits)

Analytical and numerical methods for steady-state and transient heat conduction. Empirical and practical relations for forced- and free-convection heat transfer. Radiation heat exchange between black bodies, and between non-black bodies. Gas radiation. Solar radiation. Effect of radiation on temperature measurement.

Four hours per week.

Apprenticeship I&II (2 credits)

The Apprenticeship program provides you with an opportunity to earn while you learn. As an apprentice, you will spend time both in College and in the workplace learning new skills and training alongside experienced staff, which will lead to nationally recognized qualifications. At the end of the Apprenticeship, you will have acquired job specific skills and the ability to perform your job competently; you will also achieve qualifications which are recognized by your chosen profession.

Totally 300 hours.

Automotive Workshop (1 credits)

Module Vehicular at Automotive, tune up engine adjustment, Diesel and Petrol Engines, engine body Alternate Fuel systems, Types of Clutch, gearbox (manual and automatic), propeller shafting, differential and types of rear axle, Braking System, Steering System, Suspension system, Electrical system, Safety systems, Engine cooling & lubricating Systems. Engine starting Systems. Contact Point & Electronic Ignition Systems. Carburetors, Diesel Fuel Injection Systems, Gasoline Fuel Injection Systems. Coil-Spring Clutch, Diaphragm. Spring Clutch. Double Disk Clutch. Rear Wheel Drive Line. Front Wheel Drive Line. Differentials, Drive Axles and Four Wheel Drive Line. Front Suspension System. Rear Suspension System.

Three hours per week.

Dynamics and Vibration Laboratory (1 credits)

Exploration of theory and applications of dynamics and vibrations in the laboratory. Students will start by applying Newton's Laws and Work-Energy principles to the motion of single particles, systems of particles and rigid bodies in planar motion. Then students use virtual displacements and virtual work to introduce Lagrange's formulation of the equations motion for systems of particles and rigid bodies in planar motion. Students will uncover a system's equilibrium points and perform linear stability analyses. Lastly, Students consider free and forced vibrations of linear multi-degree of freedom models of mechanical systems. Throughout the course, Students will use MATLAB® to practice numerical methods for solving dynamics and vibrations problems.

Two hours per week.

Practical Plasticity & Metals Deformation (3 credits)

Macroscopic theory of plasticity, Crystal and polycrystal plasticity; Main plastic forming operations: rolling, extrusion, deep drawing, wire drawing, forging; Formability; Internal stress; Contact mechanics; Crystallographic textures.

Four hours per week.

Fluid Mechanics II (3 credits)

Differential analysis of fluid flows, vorticity, stream function, stresses, and strains. Navier-Stokes equations and solutions for parallel flows. Euler's equations, irrational and potential flows, plane potential flows. Viscous flows in pipes, laminar and turbulent flows, major and minor losses. Flow over immersed bodies, boundary layers, separation and thickness. Drag, lift and applications. Introduction to compressible flows, speed of sound, Mach cone, and some characteristics of supersonic flows.

Four hours per week.

Statics (3 credits)

The course begins with a review of the statics of rigid bodies, which includes the identification of statically indeterminate problems. Two- and three-dimensional statics problems are treated. Thereafter, the course studies stresses and deflections in deformable components. In turn, the topics covered are simple tension, compression, and shear; thin-walled pressure vessels; torsion; and bending of beams. For each topic, statically indeterminate problems are analyzed and elementary considerations of strength are introduced.

Four hours per week.

Automatic Control (3 credits)

Fundamentals of feedback control with emphasis on classical techniques and an introduction to discrete-time (computer controlled) systems. Topics include the following: frequency domain modeling and state space modeling of dynamical systems; feedback control system concepts and components; control system performance specifications such as stability, transient response, and steady state error; analytical and graphical methods for analysis and design - root locus, Bode plot, Nyquist criterion; design and implementation of proportional, proportional-derivative, proportional-integral-derivative, lead, lag, and lead-lag controllers. Extensive use of computer aided analysis and design software. Simulation and computer-aided controller design using Matlab/Simulink.

Four hours per week.

Mechanical Vibrations (3 credits)

Transient vibrations under impulsive shock and arbitrary excitation: normal modes, free and forced vibration. Multi-degree of freedom systems, influence coefficients, orthogonally principle, numerical methods. Continuous systems; longitudinal torsional and flexural free and forced vibrations of prismatic bars. Lagrange's equations. Vibration measurements.

Four hours per week.

Fundamentals of numerical methods in solids design (3 credits)

Formulation and application of the finite element method to the modelling of engineering problems, including stress analysis, vibrations, and heat transfer. Examples illustrating the direct approach, as well as variation and weighted residual methods. Elements and interpolation functions. Meshing effect. Error analysis. One- and two-dimensional boundary value problems. Development of simple programs and direct experience with general purpose packages currently used in industry for design problems.

Four hours per week.

Mechanics of Composites (3 credits)

Introduction to fiber-reinforced composite materials and their applications. Topics include matrices; properties and forms of reinforcement; open and closed molding manufacturing processes; and introduction to resin transfer molding, filament winding, and quality, testing and damage assessment. Basics of factory operations and sustainability of composites are also addressed. Graduate students will complete a design-manufacturing project involving application of fiber-reinforced laminates.

Four hours per week.

Dynamics of Machinery (3 credits)

This design-oriented course addresses the kinematics and dynamics of mechanisms with applications to linkage systems, reciprocating engines, and industrial machinery. Conventional as well as innovative rigid-body dynamic systems are studied. Problems of kinematics and dynamics are framed in a form suited for computer analysis. The course bridges analysis and design by emphasizing the synthesis of mechanisms. To stimulate a creative approach, homework and project work draw upon actual engineering design problems.

Four hours per week. \

Fluid Mechanics I (3 credits)

This class provides students with an introduction to principal concepts and methods of fluid mechanics. Topics covered in the course include pressure, hydrostatics, and buoyancy; open systems and control volume analysis; mass conservation and momentum conservation for moving fluids; viscous fluid flows, flow through pipes; dimensional analysis; boundary layers, and lift and drag on objects. Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Four hours per week.

Hydraulics and Pneumatics (2 credits)

Introduction to the hydraulic work benches and lab equipment. Principals of hydraulic systems, power and control circuits, cavitation. Introduction to the pneumatic work benches and lab equipment. Basic pneumatic circuits. Speed control and feedback and timers. Advance pneumatic circuits. Introduction to the electrical work benches and lab equipment. Basic electrical switching circuits. Relay and timer circuits. Electro pneumatic circuits. Sensors and electrical control.

Three hours per week.

Mechanisms Design (3 credits)

This design-oriented course addresses the kinematics and dynamics of mechanisms with applications to linkage systems, reciprocating engines, and industrial machinery. Conventional as well as innovative rigid-body dynamic systems are studied. Problems of kinematics and dynamics are framed in a form suited for computer analysis. Dynamic response of single and multiple DOF (Degree of Freedom) systems. The course bridges analysis and design by emphasizing the synthesis of mechanisms. To stimulate a creative approach, homework and project work draw upon actual engineering design problems. Kinematic analysis and design of cams, gears, and linkages, velocity, acceleration and force analysis, kinematic synthesis, balancing, kinematic and force analysis by complex numbers, computer-aided analysis, and synthesis of linkages.

Four hours per week.

Fundamentals of Renewable Energy (3 credits)

Various fuels used by mankind, fossil and renewable sources; power generation technologies and the controversies; energy efficient technologies and the applications in buildings and consumable products; energy efficient manufacturing technologies; low energy infrastructure and impact to modern life style; myths behind sustainable energy systems and the debates; energy entrepreneurship, case studies and social impact.

Four hours per week.

Refrigeration System Design (3 credits)

This course covers the design of industrial and commercial refrigeration systems and system components. It includes industrial systems with multiple evaporators and compressors, moderate and low temperature, indirect refrigeration and flooded systems, commercial refrigeration and food storage technology, and compliance with safety and regulatory requirements.

Manufacturing Methods and Workshop (3 credits)

Principles and tools of measurement, hand tools and lining tools, metal machinery: Sawing, types of saw machines, capacity, usages, different kinds of saw blades. Drilling, types of drilling machines and their applications, principles of digging holes, cutting speed. Turning machines, various accessories, machine parts, cutting tools, cutting angle, cone cutting methods, bolts and their production method. Types of milling machines (horizontal, vertical, universal, gateway), types of gears. Series machinery, production methods with special machines: NC, CNC, PLC, EDM, ECM, USM, and Spark machines

Introduction of fuzzy control and soft computing (3 credits)

mathematical introduction to the analysis, synthesis, and design of control systems using fuzzy sets and fuzzy logic. A study of the fundamentals of fuzzy sets, operations on these sets, and their geometrical interpretations. Methodologies to design fuzzy models and feedback controllers for dynamical systems. Various applications and case studies.

Automatic Control Laboratory (1 credits)

This laboratory is equipped with basic instruments and real time experiments that are necessary to familiarize the students with the basic concepts and updated technology in the automatic control field. The undergraduate experiments are designed to reinforce and expand many concepts covered in the automatic control course