

course description



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

اسفاده از این فایل در صفحات مجازی و وبسایت ها با ذکر نام تهیه کننده بلامانع است.

کانال تلگرام
فلی تو ایتالی



کانال یوتیوب
فلی تو ایتالی



پیج اینستاگرام
فلی تو ایتالی



سایت
فلی تو ایتالی



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 خودشان 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

Description of Courses:

Industrial Engineering

Industrial Production

Course Title	Covered Materials & References
The Islamic Revolution & Its Roots	Familiarizing with Iran's Islamic revolution, and the events which lead to it.
General Chemistry	Introduction to chemistry science, Dalton's atomic theory, chemical laws, atomic weight, definition of mole, chemical calculations. structure of atom, electrical nature of matter, Rutherford experience, electromagnetic radiation, the origin of quantum theory (classical theory of radiation, atom's photoelectric effect of Bohr, atomic spectra and radiation), quantum mechanics, linear range, hydrogen atom, Quantum numbers (S, M, L, N), atoms with more than one electron, Energy levels, electron configuration, periodic table, radius of the atom, ion energy, electron polls, review of the core of atoms and study of radioactive isotopes. Thermo chemistry principles, self-reaction, free energy and entropy. Gas mode: Laws of gases, kinetic theory of gases. Chemical Bonds: covalence and ionic bonds, length and angle of bonds, multiple bonds, polarity of bonds, Hydrogen bond, resonance phenomenon. Metals bonds, semiconductor, and nonconductor. Liquids and solids and solutions: vaporization, vapor pressure, boiling point, freezing point, solids vapor pressure, filtration, dissolution mechanism. Equilibrium chemical systems: reversible reactions and chemical equilibrium, equilibrium constants, principles of Le Chatelier. Speed of chemical reactions: reaction speed, catalysts. Acids and bases and ionic balance: theory Arrhenius theory, Lewis theory, weak electrolytes, hydrolysis, tampon solutions. Oxidation and reduction: balancing of reeducation and oxidation reactions, Nernst equation, Galvani's cell, corrosive, chemical cells (fuel cells, batteries). Reference: Chemistry: Charles E. Mortimer
Physics I	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

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	energy, conservation of energy, gravitation, Temperature, molecular properties of gasses, first law of thermodynamics, entropy and second law of thermodynamics. Reference: Fundamental of Physics: Fundamentals of Physics, Part 1&2. David Halliday, Robert Resnick
Persian literature	Familiarizing to Persian literature and Persian poets.
General Mathematics I	Cartesian coordinates; polar coordinates; complex numbers; addition, product, root & geometrical representation of complex numbers; polar representation of complex numbers; function; functions algebra; limit and relevant theorems; infinite limit and limit in infinite; left-hand and right-hand limit; connectivity; derivative; derivation formula; inverse function and its derivative; trigonometric functions derivative and their inverse functions; Rolle's theorem; mean theorem; Taylor expansion; geometrical and physical applications of derivative; curves and acceleration in polar coordinates; application of derivative in approximation of equations roots; definition of integral of continuous functions and piecewise continuous; basic theorems of differential & integral arithmetic; primitive function; approximate methods of integral estimate; application of integral in computation of area, volume, length of curve, moment, center of gravity and labor (in Cartesian and polar coordinates); logarithm and exponential function and their derivative; hyperbolic functions; integration methods such as change of variable, component and decomposition of fractions; transform of special variables of sequence and numerical series and relevant theorems. power series and Taylor theorem and recursive functions. References: Modern calculus and Analytic Geometry: R. A.Silverman. Calculus: Louis Leithold Advanced Calculus: Spiegel
General Economics I	Introduction to microeconomics, production factors, Basic economic issues (usage degree of available resources, selecting the type and amount of goods and services, methods of production and distribution of goods and services, determination of performance or efficiency of production and distribution, economic growth), production possibility curve, definition of demand, demand curve, Factors that affect demand, demand sensitivity, definition of supply,

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	supply curve, factors that affect supply, changes in supply, supply sensitivity, balance between supply and demand and price, demand forecasting, (correlation analysis, regression analysis, time series analysis), production theory (production function, production steps), costs (fixed costs, variable costs, total cost, average cost), Income (total income, average income, final income), breakeven point analysis, determination of price and production levels in various markets. References: Microeconomics: Mehdi Taghavi Theory of microeconomic issues : Richard Perluan
Statics Prerequisite: General Mathematics I.	Force Definitions, Forces in plain, Forces in Space, equivalent systems of forces of rigid bodies, equilibrium of rigid bodies (two and three dimensions) distributed forces: centroids and centers of gravity. Trusses, Frames and machines, beams, cables, friction, moments of inertia. Reference: Vector Mechanics for Engineers: Statics by Ferdinand Beer, Jr., E. Russell Johnston, Elliot Eisenberg, and David Mazurek
English language	Teaching English Language. References: ABC's of Science Auto run English
General Mathematics II Prerequisite: General Mathematics I.	Analytic Geometry in Euclidean Plane and Euclidean Space, Vector-Valued Functions, Elementary Theory of Curves and Surfaces, Frenet-Serret Apparatus, Multivariable Functions (Limit and Continuity, Partial Derivative), Polar, Spherical and Cylindrical Coordinates, Multiple Integration, Green and Stokes Theorems, Elementary Account of Differential Forms. References: Modern calculus and Analytic Geometry: R. A. Silverman. Calculus: Louis Leithold Advanced Calculus: Spiegel

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Computer Programming Prerequisite: General Mathematics I.	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 Pascal 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. Reference: Pascal 5th Edition: Elliot B. Koffman
Technical Drawing I	introduction to origin of industrial drafting and its application; definition of projection; drawing of projection, point, line, plane; substance on a projection plane; introduction of main pages of projection; three projections drawing principles; geometrical relation between different projections; drafting tools and their application; standard dimensions of drafting papers; different types of lines and their application; table of map specifications; geometrical drawings; different methods and introduction of first and third order of dihedron; method of drawing three images of a substance in third order of dihedron; method of drawing six images of a substance in first order of dihedron; dihedron transform; image drawing from simple models; measure writing and application of letters and figures; drawing image of a substance through its determined images using method of identification of surfaces and volumes; definition of shear, simple shear (symmetric & asymmetric); broken shear; slant and radial broken shear; simple semi-shear; broken semi-shear; local shear; circulation and transformed shears; exceptional in shear; definition of concrete projection and its application; classification of concrete projections; normal concrete projection (isometric, diametric, trimetric); slant concrete projection including isometric slant (cavalier) and diametric slant (cabinet); bolt and nut junctions; rivet, welding and method of drawing of their different types; method of drawing of modulated maps in brief.
Material Science Prerequisite: General Chemistry.	Introduction to materials science: mechanical, thermal, magnetic, and structure properties of materials. Atomic arrangement in solids: crystallization, crystal system, cubic crystals. Structure of non-crystalline materials. Dislocation in crystals and diffusions. Grain boundary, electric transfer in solids, conducting metal, insulators, semiconductor materials. Single phase alloys, microscopic structure of multi-crystal metals, elastic deformation, plastic deformation. Crystallization. Fatigue, Creep, Fractures of metals. Phase diagrams (Iron-

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	Carbon, Iron-Cementite, Iron-Graphite), chemical composition of phases, phase values, solid phase reactions, sedimentary processes, Work hardening and hardness measurement, and tensile test. Clustering theory. Heat treatment. Casting and Forging. Welding. Reference: Foundations of Materials Science and Engineer: William Smith, Javad Hashemi
General Economics II Prerequisite: General Economics I.	Introduction to macroeconomics , Static and dynamic economic analysis, Definition of national income, GNP,GDP, production and income, the difference between income and capital, measuring national income, national income to price factors, value added, national income to fixed price). balance and imbalance in economic development, mechanisms of economic prosperity, mechanisms of recession and crisis, recent economic crises, definition of inflation, types and causes of inflation and its solution methods. Paasche index, Laspeyres formula ,Price indices: PPI, CPI. References: 1, Macroeconomics (theory and its application): Dr. Mohammad Tabibian 2, theory and macroeconomic policy: Mehdi Taghavi 3, Macroeconomics: Fereydoon Tafazzoli
Theory of Probability & its Application Prerequisite: General Mathematics II.	Combinatorial Analysis, Axioms of Probability, Conditional Probability and Independence, Bayes' Formula, Random Variables, Continuous Random Variables, Jointly Distributed Random Variables, Mathematical Expectation, Properties of Expectation, Limit Theorems. Reference: A first course in Probability, Sheldon Ross, M
General Chemistry Lab.	Practical Experiments Related to “General Chemistry” Course
Physics II Prerequisite: Physics I	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 in induction, magnetic properties of materials, inductance, AC circuits, Ampere’s law. Reference: Fundamental of Physics: Fundamentals of Physics, Part 3 : David Halliday, Robert Resnick

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Islamic Texts (Arabic Language Education)	Teaching Arabic language to students, in such a way that they will be able to read Holy Koran's texts.
Engineering Economics Prerequisite: General Economics I.	Decision Making process and definitions related to the engineering economy and alternatives, balanced benefit formulas, alternatives comparison methods: annual costs, Present value, calculation of interest rates, Benefit-Cost ratio, relations between engineering economy and depreciation, minimum attractive rate of return, multiple alternative comparison,(NPW, NEUA, ROR, B/C), sensitivity analysis in engineering economy, engineering economy under uncertainty. References: Engineering Economy: Gerald W. Smith Engineering Economy: HG Thuesen, WS Fabrychy and JG Thuesen Principle of Engineering Economy: Grant.EL, WG Ireson
Principles of Accounting & Costing	An overview of the financial accounts and introduction to asset items, liabilities, capital, income and expenses, investment accounts, purchasing and payments, and depreciation, profit and loss account, the balance sheet, calculating final Cost of goods produced in an institutions, billing cash flow, costs classification, methods of inventory pricing in warehouses, FIFO and LIFO methods , fixed assets and machinery depreciation calculation methods, Application of cost accounting in assessment and control of operations . Reference: Cost Accounting wast Publishing Compang: Barfied. Raiborn. Dalton
Production Methods I	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. References Machine shop practice (vol. I, II): Karl Hans Moltrecht Machine Tool Operation Part I, II: Henry D. Burghardt and Auron Axelrod Technology of Machine Tools: F. Krar & YWOswald

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Engineering Statics Prerequisite: General Mathematics I.	Force Definitions, Forces in plain, Forces in Space, equivalent systems of forces of rigid bodies, equilibrium of rigid bodies (two and three dimensions) distributed forces: centroids and centers of gravity. Trusses, Frames and machines, beams, cables, friction, moments of inertia. Reference: Vector Mechanics for Engineers: Statics by Ferdinand Beer, Jr., E. Russell Johnston, Elliot Eisenberg, and David Mazurek
Operations Research I Prerequisite: Theory of Probability & its Application .	Operations Research Models, Modeling with Linear Programming, Graphical LP Solution, The Simplex Method and Sensitivity Analysis, M-Method, Two-Phase Method, Degeneracy, Algebraic Sensitivity Analysis, Changes in the Right-Hand Side and Objective Function, Duality and Post-Optimal Analysis, Economic Interpretation of Duality, Transportation Models and Its Variants, The Assignment Models, Hungarian Method, Transshipment Model, Revised Simplex Method, Parametric Linear Programming. Introduction to LINGO and Win QSB packages. References: Operations Research, an introduction/ Hamdy A. Taha Mathematical Programming: Hillier & Liberman
Physical Education I	Teaching general sports.
Physics Lab. I	Practical Experiments Related to "Physics I" Course
Family & Population Planning	Discussions about correct sexual relations and related topics.
Precise Measurement and Quality Control Lab Prerequisite: Production Methods I.	Introduction to metrology and typical precision tools, their mechanisms and applications, direct and indirect measurement, accuracy, precision, sensitivity, resolution, repeatability, range and types of errors. Sensitive precision tools such as micrometers, Bevels, levels Calipers, protractors, and Compasses.
Motion & Time Study Prerequisite: Production Methods I.	Productivity, work study, registration of events, OPC, FPC, flow diagrams, economic movement principals, Therblings, work measurement, time measurement, work sampling, structured standard data, analytical and comparative estimating, quantitative techniques for human, machine relations, linear production techniques, line balancing. Reference: Motion and work Time : Barnes Ralph M

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Production Inventory Control & Planning I Prerequisite: Operations Research I. Theory of Probability & its Application.	Introduction to Supply chain management, MRP, ERP, types of production systems, Inventory and production planning and control, types of inventory costs, types of order systems, FOS and FOI systems, ABC analysis, Economic order Quantity, Wilson's formula, sensitivity analysis, Inventory models, safety stock calculations, probabilistic inventory models, with variable lead time, variable demand, and variable cost. Multi-product inventory models. Forecasting methods: Regression, weighted moving average, Exponential smoothing with adjusted trend, types of trends. Compression indices for forecasting methods: Cumulative forecast error, average forecast error, mean square error, means absolute error, mean absolute percent error. Reference : Operations management: William J Stevenson
Project Control Prerequisite: Operations Research I.	Definitions of Project and Control, Initial Schedule Plan, Work Breakdown Structure, types of WBS, CPM, predecessors, network techniques, Gantt chart, Allocation of resources, project progress Measurement, S-Curve, probabilistic methods of Project Planning and Controlling (PERT, GERT). Max Flow—Min Cut method. References: Project Management With CPM, PERT: Joseph J. Moder, Cecil R. Phillips, Edward W. Davis Systems Analysis and Design Using Network Techniques: Whitehouse, Gary E.
Casting (Melting & Modeling) Workshop	Objective: familiarize with casting and foundry tools in industry, learning to build various models and their application. by two workshops : 1: Melting Workshop, casting tools and types of sand molding with simple uniform, and non uniform models, the pouring of molten, models with the movable wet sands. Molds with dry sands, multi piece models casting, and pouring molten inside them. 2: Modeling Workshop, Creating a pentagon model, making model (simple cam gears), making cylinder model and place it inside a hollow cylinder, calculations related to shrinkage and slope value.
Fundamentals of Electrical Engineering Prerequisite: Physics II.	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 permanent flow generator, permanent flow generating characteristics, principles and types of

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	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 .
History of Islam	Introduction to Islam's history.
Physics II Lab.	Practical Experiments Related to “Physics II” Course.
Industrial Plants Layout Prerequisite: Production Methods I. Technical Drawing I.	Introduction to Plant Layout definitions, Steps of layout planning, S.L.P Algorithm. types of production technologies : fix product layout, product layout, process layout, group layout, job shop, and continuous layout, FMS, machine and device and human resource requirement calculations, materials flow, Simple Assembly Line Balancing, computer algorithms for layout planning CRAFT,COFAD,ALDEP,CORELAP,PLANET, service industries layout planning, nonproductive units planning, warehouse layout planning, Material Handling systems and transportations systems, quantitative location allocation models, Spiral techniques, Traveled Charting, Relationship Diagram, flexible layout models, Contour Lines. Reference: Plant Layout and Material Handling: James M. Apple
General Welding Workshop	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.
Principles of Management & Theory of Organization Prerequisite: Motion & Time Study.	Introduction to Management Principles, Managers and Management: History Module and The Historical Roots of Contemporary Management, The Management Environment, PLANNING: Foundations of Planning, Foundations of Decision Making, Quantitative Module Quantitative Decision-Making Aids. ORGANIZING: Basic Organization Designs, Staffing and Human Resource Management, Career Module Building a Career, Managing Change, Stress, and Innovation, LEADING: Foundations of Individual and Group Behavior, Understanding Work Teams, Motivating and Rewarding Employees, Leadership and Trust, Communication and Interpersonal Skills, CONTROLLING: Foundations of Control, Operations Management Reference: Fundamentals Of Management: Essential Concepts And Applications: Stephen P. Robbins, David A. DeCenzo

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Production Inventory Control & Planning II Prerequisite: Production Inventory Control & Planning I.	Introduction to types of BOM and part list. aggregate inventory investment, Lot sizing methods and their application in MRP such as : Least Unit Cost, Least Total Cost, Unit Inventory Cost, Silver and Meal's Heuristic method, Mean Cost Per Period, Wagner and Within's algorithm. Fordyce & Webster solution. Multiple Constraint Scheduling, Just in Time Concepts (JIT), Distribution Requirements and Management Issues with DRP, Capacity Planning and Utilization, Master Production Scheduling (MPS), Enterprise Resources Planning (ERP) References: Manufacturing Planning and Control System For Supply Chain Management: Thomas Vollmann, William Berry, David Clay Whybark, F. Robert Jacobs Principles of Inventory and Materials Management: Richard J. Tersine Production and Inventory Management: Donald W. Fogarty, John H. Blackstone, Thomas R. Hoffmann
Statistical Quality Control Prerequisite: Engineering Statistics. Production Methods I.	Introduction to significance of quality in business; quality policy and its objectives , economic aspects of quality, Statistical interpretation, Role of Statistical Quality Control (SQC) in Total Quality Management (TQM) and Six Sigma; SQC tools and techniques, Methods of Statistical Process Control and Capability Analysis, Control Charts for Variables and Attributes, Process and Measurement System Capability Analysis, Sum and Exponentially Weighted Moving Average Control Charts, Multivariate Process Monitoring and Control, Engineering Process Control and SPC tools, Acceptance Sampling, OC curve, AOQL, LTPD, Dodge-Romig Sampling Plans. Lot-by-Lot Acceptance Sampling for Attributes, Design of Experiments (DOE). References: Introduction to Statistical Quality Control : Douglas C. Montgomery Statistical Quality Control : Eugene Grant, Richard Leavenworth Juran's Quality Handbook : Ian Howe
Human Factors Engineering(Ergonomic Engineering) Prerequisite: Motion & Time Study.	Ergonomics or Human Factors Engineering Concerns the study of human beings and their interaction with products, environments, equipment, and machines in performing tasks and activities, therefore its objectives are to maximize human and system efficiency and productivity and quality of life by Considering the human physiological and psychological factors that underlie the design of equipment. This course covers the materials such as: What are human factors and ergonomics? Research methods, Design & evaluation methods, Vision Perception, Hearing Perception, Cognition & Memory, Displays &

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	Controls, Work-space design, Biomechanics of work, Cumulative trauma disorders, Physical and mental capacity, Stress & workload (physical & mental), Safety & human error. Human-computer interaction. References: An Introduction to Human Factors Engineering :Christopher D. Wickens, John Lee, Yili Liu & Sallie E. Gordon-Becker Human Factors in Engineering & Design: Ernest J. McCormick.
Fundamentals of Electrical Engineering Lab. Prerequisite: Fundamentals of Electrical Engineering.	Practical Introduction with “Fundamentals of Electrical Engineering” course contents.
Production Planning Prerequisite: Production Inventory Control & Planning I. Project Control. Operations Research I	Definitions, concepts, importance and the role of production planning in manufacturing processes, Introduction to MRP and MRP II, types of production planning, heuristic methods. Strategic planning and Long-term planning, medium-term planning, and short-term Planning. Manufacturing Process: series of operations that should be performed in order to raw materials convert to finished goods; Such as the layout process, machine and labor operations sequence. Static production planning models, the application of linear programming in production planning, determining the best production process, capacity requirement planning (CRP), determining the economic level for a production machine, Dynamic production planning models: production models with linear cost, dynamic programming models, Line Balancing: balancing the manufacturing resources, heuristic methods and mathematical models, multi-product models, multi-stage production models. Probabilistic models, Production planning with probabilistic and fixed demand for multiple production periods. Operations Planning: Sequencing and Scheduling Systems, workshop planning for N work on one machine. N work on two machines, n work on Three machines, N work on M machines. References: Operation Research in Production Planning: Montgomery and Johnson Production and Inventory Management: Fogarty Hoffman, Blackstone

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Computer Application in Industrial Engineering Prerequisite: Production Inventory Control & Planning I. Project Control. Operations Research I	Learning computer packages related to Industrial Engineering such as: LINGO, WINQSB, Microsoft Project, Ms Excel, Ms Access, CRAFT, CORELAP, ALDEP, Simulation packages, GPSS, arena, G-Code Programming.
Repairs & Maintenance Planning Prerequisite: Theory of Probability & its Application. Engineering Economics.	Introduction and definition of maintenance planning and control maintenance plans, failure rate, van curve, maintenance control, lubrication and general maintenance planning, analysis of failure rates of machines, preventive maintenance, emergency maintenance, maintenance costs, work sampling and control systems, maintenance management, training and education of manpower, implementation and Setup, budgeting allocation, parts replacement models, replacement decision, group replacement, reliability models and management. References : Maintenance Management Techniques: Corder Maintenance, Reliability and Replacement: AKS Jardine
Information Systems & Management Control Plan Prerequisite: Operations Research I.	Introduction to management information systems (MIS), systematic approach and system parameters. Introduction to classic and organizational approached mythologies such as SSADM, BSP, JSD, Oracle, RUP, Information engineering, Information architecture, and CASE tools. Reference: Basic Information Systems Analysis and Design: M. Chester and A. Athwall. Structured Systems Analysis and Design Method: Ed Downs, Peter Clare, Ian Coe
Strength of Materials Prerequisite: General Mathematics II. Statics.	Concept of Stress and Strain, Mohr's Circle, Axial loading, Torsion, Analysis and design of beams for bending, shearing stresses in beams and thin walled members, Transformation of stress and strain, principal stress under given conditions, deflection of beams, columns, energy methods. References: Mechanics of Materials by Ferdinand Beer, Jr., E. Russell Johnston, John DeWolf, and David Mazurek

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Physical Education II	Teaching expert field of sports.
Differential Equations Prerequisite: General Mathematics I.	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, homogenous 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. Reference: Elementary Differential Equations and Boundary Value Problems: W. E. Boyce and R.C. Dippima.
Islamic Ethics & Education	Ethics in Islam's view.
Production Methods II Prerequisite: Production Methods I. Strength of Materials.	Forming molten metals, casting processes, sand casting, centrifugal casting, rotational casting, coating, steel sheet and wire production methods, iron and steel permanent molding, DIE Casting, Investment casting, permanent casting. Hot chamber and Cold chamber, metal production methods, Extrusion, aluminum, magnesium and copper alloys forging, bending, and rolling, Pipe production methods, capsules production methods, wire extrusion, cold rolling, forming and twisting by cold rolling, Metal spinning, stretch forming, Drop, Hammer Forming, cold bending, Powder metallurgy, soldering, Welding, plaster casting, types of Plastics and Plastics forming, Plastics processing, Heat-soft Plastics, Heat-hard Plastics, Acrylics, cellulose materials, polyethylene, Polypropylene, Vinyl (PVC, PVDC), Poly Acetyls, Poly carbonate, Polyamide,(nylon),Types of plastic molding, Injection, reaction injection molding, blow molding, injection blow molding, Pressure molding, transfer molding, thermal shaping, Mechanical shaping. References: Manufacturing Processes: Amstead, B H & Phillipe F Oswald & Myron L Begeman Metals Hand Book (Forging and Casting)
Machine Tools Workshop I	An introduction to principles of safety and health in workshops and modality of application of tools and instruments in these workshops. In this course, the

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	student shall learn method of work with workshop tools and equipment in Machine Tools, and Practical Experience with machine tools with a project.
Specialized English Language Prerequisite: English Language.	English reading texts covering subjects in: Work Study, Factory Design, Production systems, Operations research, Ergonomics, Engineering economy, Production methods, Time measurement, Quality Control, Transportation, Computer applications in industrial engineering, Project Control, Principles of Management, Computer simulation.
Industrial Safety & Health	History and development of safety, laws on occupational health and safety, the administration of safety, inspection and control, remove and control the risks at work, recording accidents at work, investigate the causes of accidents and related costs, accident insurance, education, expanding and motivating for safety in factories, safety in office environments, safety in industrial environments, planning for emergencies, personal protection equipment, public health issues, Health services, Safety of non-working people in environment, support organizations of immune systems, electrical hazards, fire prevention. Reference: Industrial Accident Prevention : Herbert W Heinrich
Operations Research II Prerequisite: Operations Research I.	Network Models, Minimal Spanning Tree Algorithm, Shortest-Route Problem, Goal Programming Algorithms, Integer Linear Programming, Set-Covering Problem, Branch-and-Bound (B&B) Algorithm, Cutting-Plane Algorithm, Deterministic Dynamic Programming, Forward and Backward Recursion, Decision Analysis, Decision Making under Certainty, Risk, and Uncertainty, Analytic Hierarchy Process (AHP), Game Theory, Queuing Systems, Poisson Queuing Model, Multiple-Server Models, Machine Servicing Model— (M/M/R):(GD/K/K). (M/G/1):(GD/ ∞ / ∞)—Pollaczek-Khintchine (P,K) Formula, Unconstrained and constrained Nonlinear Programming Algorithms, Quadratic Programming. References: Operations Research, an introduction: Hamdy A.Taha Mathematical Programming: Hillier & Liberman
Industries Establishment Design Project Prerequisite: Industrial Plants Layout Principles of Accounting & Costing.	Definition of small and medium industries and their role in the countries developments, preparing a plan containing market study, demand management and forecasting, technical and economical feasibility study, specifying the location of industry and its capacity, design engineering, specifying product manufacturing methods, estimating human resource requirements, layout design, project costing, project financing, forecasting the financial

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	performance, instructions to implementation of project, project plan and control, schedule the project implementation. Introduction to COMFAR package.
Islamic Studies I	Familiarizing to the instructions of Islam.
Imam's Testament	Some texts of Imam Khomeini's testament.
Training Prerequisite: Passing 100 course credits.	Students have to work in a company or manufacturer in a field related to their interests or project for 240 hours.
Technical Drawing II Prerequisite: Technical Drawing II.	Geometrical Constructions, Scales, Conic Sections, Special Curves, Orthographic Projection, Projections of Points, Projections of Straight Lines, Projections of Planes, Projections of Solids, Auxiliary Projections of Solids, Sections of Solids, Intersection of Surfaces, Development of Surfaces, Isometric Projections, Oblique Projection, Perspective Projection Reference: Engineering Drawing & Graphics: Mathur MI, Vaishwanar Rs.
Machine Tools II Workshop (Lab)	Practical Experience with machine tools with a more complicated object project than "Machine Tools Workshop I"
Decision Making Analysis	This course offers professional approaches to problem solving and prevention. The processes covered provide decision making templates to arrive at defensible business decisions. These methods permit students to analyze business situations and reach decisions under conditions of uncertainty. Multi criteria Decision making (MCDM) , AHP Matrix, Topsis, Game theory and Fuzzy Models are important materials in this Course References: Decision making ,descriptive, normative, and prescriptive interactions David E. Bell, Howard Raiffa- Cambridge University Press Decision analysis: introductory lectures on choices under uncertainty Howard Raiffa
Islamic Studies II Prerequisite: Islamic Studies I.	Familiarizing to the instructions of Islam, continuing "Islamic Studies I" discussions.

Description of Courses: Industrial Engineering

Numerical Computations Prerequisite: Computer Programming.	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-Raphson method; Mathematical modeling of engineering problems: physical system, classification of problems, system analysis (topological modeling, systems with concentrated 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 with initial condition. Finite difference method for ODE with boundary conditions; Numerical solving of elliptic equations, and parabolic equations (explicit and implicit schemes; Thomas algorithm); References: Numerical Methods in Engineering and Science: Graham de Vahl Davis Numerical Methods for Engineering and Computer Scientists: Paul F. Hultquist Elementary Numerical Analysis: S.D. Conte and Carl de Boor
Introduction to Holy Koran	Teaching to read Holy Koran's Text in Arabic and Teaching Some Contents of Holy Koran