

CHAPTER ONE

**The Departments of the Faculty of Engineering
and the Bachelor of Science Degree**



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The Departments of the Faculty of Engineering and the Bachelor of Science Degree

Article (1): The Faculty of Engineering is composed of the following departments:

- 1- Engineering Mathematics and Physics
- 2- Architectural Engineering
- 3- Structural Engineering
- 4- Irrigation Engineering and Hydraulics
- 5- Transportation Engineering
- 6- Sanitary Engineering
- 7- Mechanical Engineering
- 8- Textile Engineering
- 9- Production Engineering
- 10- Marine Engineering and Naval Architecture
- 11- Electrical Engineering
- 12- Computer and Systems Engineering
- 13- Nuclear and Radiation Engineering
- 14- Chemical Engineering.

Article (2): The following subjects are within the domain of each department:

1- Engineering Mathematics and Physics Department

Mathematics - Statistics - Mechanics - Physics - Engineering Drawing and Geometrical Projection.

2- Architectural Engineering Department

Architectural Design Fundamentals - Building Construction - Visual Studies & Theory of Colors - Computer in Architecture - History of Architecture - Theories of Architecture - Shade - Shadow and Perspective - Environment Control in Buildings - Architectural Design - Execution Design- Theory of structures - Properties and Testing of Materials - Technical Systems in Buildings - History of Islamic Architecture - History of Islamic Architecture - History of City & Site Planning - Interior Design - Structural Engineering - Urban Planning and Housing - Quantities & Specifications - Public Buildings Design – Research methodology & Programs - Theories of Architecture and Criticism - Housing Design - Housing Theories and Economics - Urban Design Projects - Theories of Urban Design - Graduation Project - Law and Architectural Legislation - Architecture Professional Practice - Landscape Architecture - Contemporary Arts - Heritage Preservation - Architecture and Environment - Site Analysis Studies - Construction Project Management - Construction and Building Technology - Projects Feasibility Studies - Housing in Developing Countries - Design of Rural Communities - Urban Geography - Urban Space - Urban Infrastructure - Geographical Information Systems - Urban Economics

3- Structural Engineering Department

Theory of Structures - Testing and Properties of Materials - Soil Mechanics, Foundation Engineering - Reinforced Concrete - Construction Engineering - Modern Methods for Structural Analysis - Management of Engineering



Constructions - Advanced Engineering Materials - Steel Structures - Design of Industrial and Tall Buildings - Concrete Structures and Bridges – Contracts – Quantities and Specifications - Repair, Inspection, and Quality Control - Steel Structures and Bridges.

4- Irrigation Engineering and Hydraulics Department

Hydrology – Hydraulics – Design of advanced irrigation systems – Irrigation and Drainage Engineering – Applied hydraulics – Design of pipeline and piping network – Design of Irrigation Structures – Hydraulic Structures – Computer application in hydraulic structures.

5- Transportation Engineering Department

Surveying and Topography - Civil drawing - Engineering Geology - Surveying and Topography - Transportation Planning and Traffic Engineering - Applications of new technologies and instruments in surveying - Engineering - Alignment and setting out of civil engineering projects - Railway Engineering - Harbor Engineering and Marine structures - Highway Engineering - Transportation Systems Planning - Coastal engineering – Computer applications in civil engineering.

6- Sanitary Engineering Department

Water Supply Engineering - Sanitary Engineering - Wastewater Engineering - Environmental protection Engineering - Environmental Sciences

7- Mechanical Engineering Department

Mechanics of Materials - Fundamentals and Measurements of Fluid Flow and Heat - Mechanical Drawing - Mechanics of Machinery - Computer Aided Mechanical Drawing - Thermodynamics - Computer Applications in Mechanical Engineering - Mechanical Design - Fluid Mechanics - Fundamentals of Combustion Engineering - Mechanical Vibrations - Internal Combustion Engines - Heat Transfer - Gas Dynamics - Automatic Control - Thermal Power Plants - Hydraulic Machines - Refrigeration and air Conditioning - Optimum Design - Design of Thermal Equipment - Industrial Fluid Mechanics - Gas Turbines - Introduction to Mechatronics - Operation and Management of Thermal Power Stations - Fluid Machinery - Advanced Topics in Combustion Engineering - Tribology - Applications in Thermal Engineering - Hydraulic Circuits - Automotive Engineering – Environment & Energy.

8- Textile Engineering Department

Drawing and machine construction - Raw material and fiber physics - Design and theory of textile Machinery - Spinning technology - Weaving preparation - Textile technology - Yarn physics and testing - Textile quality control - Technology of yarn production - Physics and Fabric Structure – Computer Application in Textile Industry - Information systems - Mechanics of Textile Machinery - Technology of wool yarn production - Weaving technology - Technology of man-made yarn production - Ready made garments - Non woven fabric - Manufacturing and End–use of technical Industrial fabrics - Technology of Texturizing - Theories of spinning - Weaving and knitting - Garment Engineering - Technology of Non conventional yarn production - Technology of non – conventional cloth production - Automatic control and robotic systems in Textile mills - Finishing technology - New spinning systems - New weaving systems.



9- Production Engineering Department

Materials Technology - M/C Tool Elements Drawing - Foundry and Welding - Operations Research - Machining processes - Forming Technology - Theory of Metal Cutting - Solid Mechanics - Dimensional Metrology - Machine Tool Elements Design - Theory of Machines - Plasticity and Metal Forming - Theory & Design of M/C Tools - Geometrical Metrology - Facilities Layout & Design - Production Planning & Control - Advanced M/C Tools - Automatic Control - Advanced Metrology Systems - Mechatronic Systems - Advanced Material Technology - Quality Control - Machine Tool Dynamics - Abrasive Machining - Non Destructive Testing - Non Conventional Machining - Non Conventional Forming - Engineering Management & Organization - Quality Improvement & Management - Engineering Material Selection - Knowledge Engineering - Computer Aided Metrology Systems - Advanced Machining Technology - Failure Analysis - CNC Machine Tools - Principles & Applications of Noise Control Systems - Industrial Systems Modeling & Simulation - Die Design - Maintenance Technology (Condition Monitoring).

10- Marine Engineering and Naval Architecture Department

Ship Machinery Drawing - Naval Architecture - Ship Structural Analysis - Ship and Machinery Drawing - Fluid Mechanics - Ship Construction - Computer Programming - Fluid Mechanics and Hydraulic Machines - Material Technology - Ship Structural Design - Ship Hydrodynamics - Ship Propulsion Systems - Probabilistic Methods in Marine Systems - Shipbuilding Technology - Ship Design - Marine Power Plants - Dynamics of Marine Vehicles - Ship Outfittings - Offshore Engineering - Computer Aided Ship Design - Risk Analysis - Shipyard Engineering - Heat Transfer & Refrigeration and Air Conditioning - Marine Structural Dynamics - Auxiliary Machinery.

11- Electrical Engineering Department

Electric Circuits, Modern Physics, Introduction to Energy Systems, Electric and Electronic Measurements, Electronic Devices and Circuits, Introduction to Logic Circuits and Programming, Electric Circuit Analysis, Microprocessor Fundamentals, Electromagnetic Fields, Electronic Engineering, Electric Power Engineering, Electric Machines, Control and Computer Applications, Measurement Systems, Introduction to Integrated Circuits, Power Electronics, Protection of Power Systems, Automatic Control Engineering, Electric Engineering Materials, Communications for Electrical Power Systems, Signal Processing for Electrical Power Systems, Power System Analysis, Industrial Applications and Installation Engineering for Power Systems, Special Electric Machines, Mechatronics and Robotics, Industrial Automation, High Voltage Engineering, Electrical Drives, Operation and Planning of Electrical Power Systems, Solid State Drives, Control of Electrical Power and Machines, Solid State Electronics, Electronic Circuit Analysis, Logic Circuit Design, Electric Machines and Power Systems, Semiconductor Devices, Microprocessors, Electromagnetic Waves and Acoustics, Signals and Systems, Analog Integrated Circuits, Microwave and Optical Transmission Media, Analog Communications, Control Systems and Their Components, Microwave Devices, Optical Devices, Electronic and Microwave Measurements, Optical Communications Systems, Digital Integrated Circuits, Antenna Engineering, Digital Signal Processing, Communication Systems, Modeling and Design of VLSI Integrated Circuits,



Advanced Communication Systems, Biomedical Engineering, Communications Networks, Digital Control Systems and Robotics, Digital Communications.

12- Computer and Systems Engineering Department

Computers and programming, programming, probability theory and its applications in computers, data structures, computer fundamentals, computer mathematics, statistical methods for computers, digital systems, numerical analysis and its applications in computers, systems and components programming, linear control systems, micro systems, digital nonlinear control, analysis of algorithms, algorithms for digital signal processing and digital signal transmission, operating systems, operations research and computers, embedded systems, computer architecture, programming languages and translators, database management systems, communications and computer networks, software engineering, artificial intelligence, computer graphics, switching theory and computation models, pattern recognition, optimization technologies, special topics in computer engineering, special topics in information systems and software, modern control systems, distributed systems and network programming, topics in computer networks, special topics in systems engineering, special topics in computer science, performance evaluation of computer systems

13- Nuclear and Radiation Engineering Department

Modern Physics - Introduction to Engineering Materials Science - Introduction to Nuclear & Radiation Engineering - Properties & Testing of Nuclear Materials - Nuclear Physics - Thermodynamics & Kinetic Theory of Gases - Radiation Safety - Nuclear Reactors Materials - Radiochemistry - Heat Transfer - Materials Characterization Techniques - Radiobiology - Simulation of Nuclear Power Stations - Quantum Mechanics - Electromagnetics & Plasma Theory - Nuclear Reactors Physics - Radiation Detection - Thermal Power Stations - Computational Methods in Materials - Fundamentals of Simulation of Radiation Transport - Nuclear Reactor Safety - Nuclear Reactors Analysis - Radiation Shielding Design - Reactors Automatic Control - Nuclear Fuel Cycles - Non-destructive Testing - Introduction to Medical Radiography - Nuclear Power Stations - Reactors Kinetics - Applications of Radioisotopes - Materials Radiography - Radiation Health Physics - Measurements of Nuclear Power Stations.

14- Chemical Engineering Department

Engineering chemistry – Programmed calculations for chemical engineers - Organic chemistry - Inorganic chemistry - Physical chemistry - Surfaces chemistry and phase equilibria - Inorganic and analytical chemistry - Materials science - Chemical processes - Engineering metallurgy - Chemical engineering fundamentals - Thermodynamics in chemical engineering - Heat transfer - Fluid flow engineering - Separation processes - Corrosion engineering - Modeling and simulation in chemical engineering - Water treatment - Biochemical engineering - Fuel engineering and combustion – Alternative energy resources - Chemical reaction engineering - Electrochemical processes - Fertilizers technology - Silicate industries - Extractive metallurgy - Technology of natural fibers and tissues - Oils and fats technology - Dyestuffs and textile finishing - Mechanical unit operations - Chemical process industries - Petroleum refining engineering - Natural gas engineering - Wastewater treatment - Treatment of solid and gas



wastes – Chemical process control – Design of chemical processes – Water desalination - Safety engineering and explosives - Non-Newtonian fluids - Polymer engineering - Composites and reinforced materials - Petrochemicals..

Article (3): The Vice-Dean for Education and Student Affairs supervises Humanities, Foreign and Technical Language courses. He may assign the supervision of some of these courses to one or more of the departments of the Faculty of Engineering.

Article (4): (a) The tables annexed to Article (26) show the courses, their respective weekly hours and their distribution among the lectures, tutorials, labs and oral. The tables also show that duration of the final exams for each course as well as the marks assigned for the class work, lab, oral and final exams.
(b) Article (27) shows the contents of the each course

Article (5): Alexandria University grants the degree of the Bachelor of Science based on the request of the council of the Faculty of Engineering in one of the following specializations:

- 1- Architectural Engineering, in one the following branches:
 - a) Public buildings
 - b) Housing
 - c) Urban design
- 2- Civil Engineering
- 3- Mechanical Engineering
- 4- Textile Engineering
- 5- Production Engineering
- 6- Marine Engineering and Naval Architecture
- 7- Electrical Engineering, in one of the following two branches:
 - a) Power and Electrical Machines
 - b) Communications and Electronics
- 8- Computer and Systems Engineering
- 9- Nuclear and Radiation Engineering
- 10- Chemical Engineering

The Bachelor of Science degree is granted yearly, in June and November