Attributes of Design and Production Engineering Graduates in the Proposed Bylaw

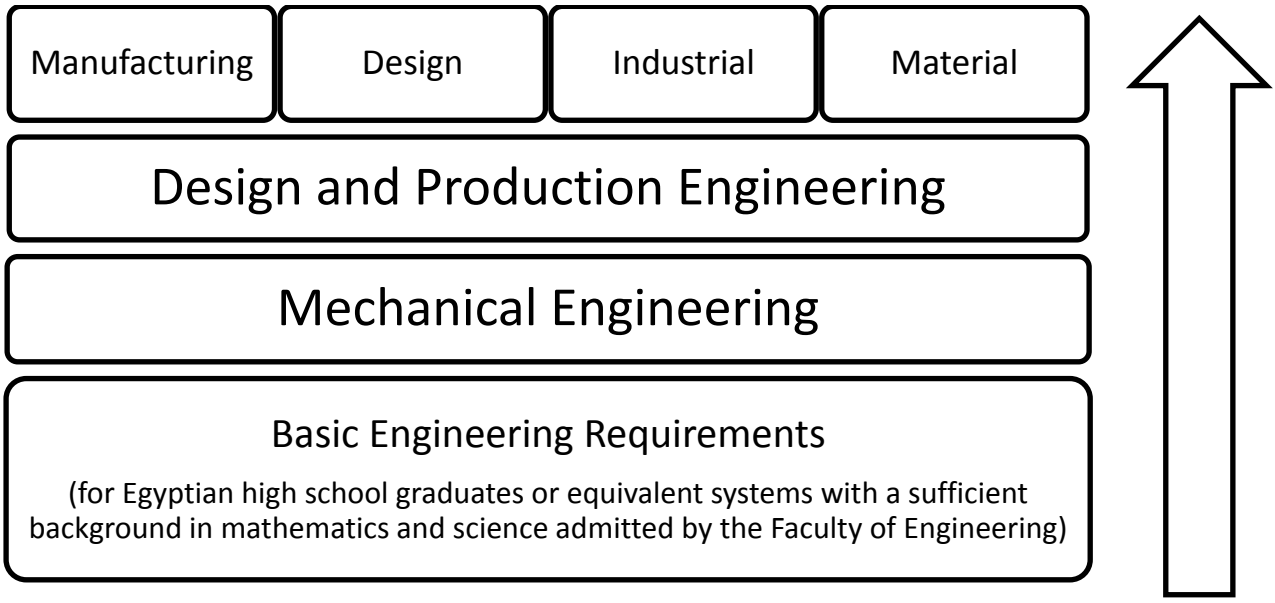
Contents

Objectives of the Design and Production Engineering Program

1. The Design and Production Engineering Program prepares students for entry level professional practice in mechanical design and production engineering, both locally and internationally. It inspires students after their graduation for self-learning to cope with the requirements of ever-changing career path.
2. Qualifying the graduates to a specific field of concentration:
    - Manufacturing engineering
    - Mechanical design
    - Industrial engineering and operations management
    - Materials engineering
3. Developing the student capabilities in problem solving, analysis, critical thinking, team work, and communication with others.

Formation of the Program

The engineering mentality of the student is formed through the following path:



Students study:

- Basic engineering requirements courses necessary for engineers in general.
- Mechanical engineering requirements courses necessary for mechanical engineering in general.
- Design and Production engineering courses.
- A certain number of concentration courses (two courses) and the graduation project in one field of concentration.

Graduates' Attributes

The graduates of the program gain a collection of attributes which can be classified into:

1. Basic attributes necessary for engineers in general (clearly listed in NARS-2018),
2. Attributes necessary for mechanical engineers (listed in NARS-2018), and
3. Specific attributes reflecting the essence of the Faculty of Engineering - Ain Shams University and its points of strength.

1. Basic Engineering Attributes

The program graduates possess the necessary attributes for engineers in general, proposed in NARS-2018, including:

1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgement to draw conclusions.
3. Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects appropriate to the discipline and within the principles and contexts of sustainable design and development.
4. Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
5. Practice research techniques and methods of investigation as an inherent part of learning.
6. Plan, supervise and monitor implementation of engineering projects.
7. Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.
8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
10. Appreciate the ongoing need to acquire and apply new knowledge and to practice self, lifelong and other learning strategies.

2. Mechanical Engineering Attributes

The program graduates possess the necessary attributes for mechanical engineers, clearly identified by NARS-2018, including:

1. Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, Solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.
2. Design mechanical systems and machine elements using appropriate materials using traditional means, computer-aided tools and software contemporary to the mechanical engineering field.
3. Select conventional mechanical equipment according to the required performance.
4. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain mechanical equipment and systems.

3. Design and Production Engineering Attributes

Graduates of the Design and Production Engineering Program at Ain Shams University are able to work professionally in industry equipped with the following skills:

1. Implement basic theories to production processes including new technologies in manufacturing to select proper processes and process parameters for specific products.
2. Design systems, machines, tools, and products implementing proper standards and developing the necessary calculations, construction and working drawings
3. Implement basics of industrial engineering to analyze, plan and design production systems.
4. Select materials suitable for specific applications.

4. Specific Attributes within Design and Production Engineering according to the Concentration

Program graduates at Ain Shams University, can be specialized in one of the concentrations within the Design and Production Engineering program through two elective courses and graduation project. The proposed concentrations and resulting graduate attributes are:

Concentration	**Graduate attributes**
Manufacturing	Demonstrate additional abilities to select and link different manufacturing processes to certain design requirement to achieve desired levels of quality, product and process performance.
Mechanical design	Demonstrate additional abilities to model, analyze, and design mechanical components and systems using the most up-to-date tools of integrated systems.
Industrial engineering	Demonstrate additional abilities to analyze, design, integrate, operate, evaluate, control, automate, and implement methods and techniques to manage industrial systems.
Materials engineering	Demonstrate additional abilities to select, prepare, analyze, treat, and test materials for specific applications.