



Ain Shams University
Faculty of Engineering
Specialized Credit Hours Programs
(S-CHEP)

Design and Production Engineering Program
2018/2019



Program Specifications Competences Based
University: Ain Shams Faculty: Engineering

A- Basic Information

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| <ol style="list-style-type: none">1. Programme title:2. Programme type:3. Faculty:4. Department(s) offering the Program:5. Coordinator:6. External evaluator(s):7. Internal Evaluator:8. Date of program bylaw approval:9. Date of program specifications approval: | B. SC. in Design and Production Engineering

Single <input checked="" type="checkbox"/> Double <input type="checkbox"/> Multiple <input type="checkbox"/>
Faculty of Engineering – Ain Shams University
Design and Production Engineering
Prof. Adel Elsabbagh
Prof. Shaaban Abdo
Prof. Mostafa Chaaban
2018
September 2021 |
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B- Professional Information

1. Program Mission

The mission of the Design and Production Engineering program is to provide quality learning that is driven by a professional and technology-oriented focus and highly committed to innovation and industrialization. The department is devoted to educating and inspiring future generations of mechanical design and production engineers who are both technically skilled and ethically professional. The program is therefore based on the following intentions:

- PM1. Prepare students for a professional career with a broad knowledge of basic and practical mechanical engineering with high emphasis on the different aspects of production engineering; material technology, mechanical design, manufacturing processes and industrial aspects.
- PM2. Conduct engineering research and to pursue graduate degrees in the above fields
- PM3. Achieve leadership positions in scientific and technological enterprises in Egypt and globally.
- PM4. Compete internationally in the fields of mechanical design and production engineering.
- PM5. Behave ethically based on the professional principles.

2. Program Aims

The main aims of the "Design and Production Engineering" program at the "Faculty of Engineering" in "Ain Shams University" are to equip the student with the proper scientific knowledge and develop his/her skills to::

- PA 1. Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.
- PA 2. Design a system; component and process to meet the required needs within realistic constraints.
- PA 3. Design and conduct experiments as well as analyse and interpret data.

- PA 4. Identify, formulate and solve fundamental engineering problems.
- PA 5. Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management.
- PA 6. Work effectively within multi-disciplinary teams.
- PA 7. Communicate effectively.
- PA 8. Consider the impacts of engineering solutions on society & environment.
- PA 9. Demonstrate knowledge of contemporary engineering issues.
- PA 10. Display professional and ethical responsibilities; and contextual understanding
- PA 11. Engage in self- and life- long learning.
- PA 12. Work with mechanical design and manufacturing systems.
- PA 13. Use of mathematics and physical and engineering sciences and systems analysis tools in products, components and machines design, and/or the manufacturing of such products, components and machines.
- PA 14. Use different instruments, devices and tools appropriately and carry-out wide range of experiments, automatic data acquisition, data analysis and interpretation, and data presentation, both orally and in the written form.
- PA 15. Use the computer software for design, communication and visualization.
- PA 16. Use and/or develop computer software, necessary for the design, manufacturing and management of industrial systems and projects.
- PA 17. Analyze multi-disciplinary mechanical, electrical, electronic, thermal and hydraulic systems.
- PA 18. Lead and supervise groups of designers, technicians and other work force.

3. Graduate 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:

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

4. Program Competencies

Considering NARS 2018, any program competencies are classified into three categories: General competencies, Speciality Competencies, and either Sub-Speciality or Inter-Disciplinary competencies. For the Design and Production Engineering program, and in light of NARS 2018, the program competences are categorised into four categories:

- The “Zero” level: This category is planned to accommodate a single general competence that expresses the basic and general competence any university graduate should be characterised whatever his/her speciality is,
- The “A” level: This category is planned to accommodate the competencies that any engineering graduate should be characterised with,
- The “B” level: In this case, the category of competencies for any Mechanical engineer,
- The “C” level: This category specifies the competencies for any Design and Production Engineering graduate.

Based on that the program graduate must be able to:

0. General Common Competences

- A0- Illustrate a fair awareness of national, regional and international contemporary issues, to have an intellectual and enlightened personality and to interact effectively in the community through different communication skills.

A. General Competences

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

- A1- Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
- A2- Develop and conduct appropriate experimentation and/or simulation, analyse and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
- A3- 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 as appropriate to the discipline and within the principles and contexts of sustainable design and development.
- A4- Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
- A5- Practice research techniques and methods of investigation as an inherent part of learning.
- A6- Plan, supervise and monitor implementation of engineering projects.
- A7- Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.
- A8- Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
- A9- Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
- A10- Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

B. Mechanical Engineering Competences

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

- B1m. 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.
- B2m. Design mechanical systems and machine elements using appropriate materials using traditional means, computer-aided tools and software contemporary to the mechanical engineering field.
- B3m. Select conventional mechanical equipment according to the required performance.
- B4m. Adopt suitable national and international standards and codes to: design, build, operate, inspect and maintain mechanical equipment and systems.

C. Design and Production Engineering Competences

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

- C1. Implement basic theories to production processes including new technologies in manufacturing to select proper processes and process parameters for specific products.
- C2. Design systems, machines, tools, and products implementing proper standards and developing the necessary calculations, construction and working drawings
- C3. Implement basics of industrial engineering to analyze, plan and design production systems.
- C4. Select materials suitable for specific applications.
- C5. 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:
 - C5a. 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 .
 - C5b. Mechanical design Demonstrate additional abilities to model, analyze, and design mechanical components and systems using the most up-to-date tools of integrated systems.
 - C5c. Industrial engineering Demonstrate additional abilities to analyze, design, integrate, operate, evaluate, control, automate, and implement methods and techniques to manage industrial systems .
 - C5d. Materials engineering Demonstrate additional abilities to select, prepare, analyze, treat, and test materials for specific applications.