



Faculty of
Engineering at benha

Farabi Quality Management of Education and Learning - 23/1/201923/1/2019

University :Benha university

Faculty :Faculty of Engineering at benha

Model No.13
Programme Specifications
Mechanical Power Engineering
Academic Year2017 - 2018

A- Basic information :

| | |
|---|--|
| 1. Programme title | Mechanical Power Engineering |
| 2. Programme type | Single |
| 3. Adoption program Date | 01/09/2012 |
| 4- Department responsible for the program | Department تكنولوجيا الهندسة الميكانيكية - 1 / Faculty of Engineering at benha |

B- Specialized information :

1- General objectives of the program

- 1- The mechanical Power Engineering Program in Benha Faculty of Engineering is designated to prepare a qualified distinguished graduate with BSc degree in Mechanical Power Engineering.
- 2- This program is intended to help and prepare students to (i) Develop and to maintain various types of power stations, boilers, gas or steam turbine, internal combustion engines, refrigeration systemset and to develop safety control system in the these equipment (ii) Design, operate, and maintain the liquid, vapor and gas network piping and ducting systems and involved equipment, (iii) Develop and design mechanical services and fire protection systems for buildings and projects, (iv) Develop methods for reducing the pollutant emissions from different systems, and (v) Improve the maintenance and the performance of the combustion equipment, turbo-machinery and refrigeration systems.
- 3- Upon the completion of this program, the graduate will be ready to work in different relative society and fields related to thermos-fluid and energy applications such as (i) Processing or user industries, (ii) Power stations and petrochemical plants, (iii) Management in industries, (iv) Establishments concerned with cars, ships, energy generation or aerospace and refrigeration and air conditioning, (v) Safety and environmental concerns, and (vi) Research and development centers.

2- Intended learning outcomes (ILOS)

a- Knowledge and Understanding

- a1- Fundamentals of thermal and fluid processes
- a2- Internal combustion, pumps, turbines and compressors, classification, construction design concepts, operation and characteristics
- a3- Fluid power systems
- a4- The constraints which mechanical power and energy engineers have to judge to reach at an optimum solution
- a5- Business and management techniques and practices appropriate to mechanical power and energy engineering applications
- a6- Mechanical power and energy engineering contemporary issues
- a7- Basic theories and principles of some other engineering and mechanical engineering disciplines providing support to mechanical power and energy disciplines

- a8- Mechanical systems servicing buildings and industrial zones

b- Intellectual Capacity

- b1- Evaluate mechanical power and energy engineering designs, processes and performances and propose improvements
- b2- Analyze and interpret data, and design experiments to obtain new data
- b3- Evaluate the power losses in the fluid transmission lines and networks
- b4- Analyze the performance of the basic types of internal combustion engines and hydraulic machines
- b5- Analyze fluid power systems, subsystems and various control valves and actuators
- b6- Analyze the requirements to service and protect buildings and projects

c- Professional Skills

- c1- Use basic workshop equipment safely and appropriately
- c2- Prepare engineering drawings, computer graphics and specialized technical reports
- c3- Write computer programs pertaining to mechanical power and energy engineering
- c4- Describe the basic Thermal and fluid processes mathematically and use the computer software for their simulation and analysis
- c5- Design, operate, repair and maintain fluid hydraulic power systems for diverse applications
- c6- Carry out preliminary designs of fluid transmission networks, internal combustion and steam engines and solve their operational problems
- c7- Work in mechanical power and energy operations, maintenance and overhaul
- c8- Design, prepare drawings, and describe specifications of mechanical systems servicing different buildings

d- General Skills

- d1- Acquire practical skills for real power systems
- d2- Refer to relevant applicable standards and codes

3- Academic standards

- 1- National Academic Reference Standard (NARS)

4- External references for standards (Benchmarks)

- 1- American Accreditation Board for Engineering and Technology (ABET)

5- Curriculum structure and contents

a - Programme duration 5

b - Programme Structure

| | | | | | | |
|--|-------------|-----|-----------|-------|----------|-----|
| 1 - No of hours /No of Units : | Theoretical | 162 | Practical | 110 | Total | 272 |
| | Compulsory | 150 | Elective | 12 | Optional | |
| 2 - Basic sciences Courses : | 40 | | | 25% % | | |
| 3 - Social sciences and humanities courses : | 16 | | | 10% % | | |
| 4 - Specialized courses : | 44 | | | 27% % | | |
| 5 - Other Courses : | 46 | | | 28% % | | |
| 6 - Practical/field training: | 10% | | | | | |

6- Programme courses

-Fourth Year / الأئحة الداخلية لكلية الهندسة بينها) القوى الميكانيكية / الهندسة الميكانيكية

a- Compulsory :

| code | Course Title | No.of Units | No. of hours/week | | | Semester |
|--------|-----------------------------|-------------|-------------------|--------|------|-----------------|
| | | | Lect. | Excer. | Lab. | |
| ١٥٠٠ م | Project-Project | 2 | 2 | | 6 | First Semester |
| ١٤٢١ م | Power Systems Components | 3 | 3 | 2 | 1 | First Semester |
| ١٤١١ م | Hydraulic and Turbomachines | 3 | 3 | 2 | 1 | First Semester |
| ١٤٢٣ م | Power Stations | 3 | 3 | 2 | 1 | First Semester |
| ١٤٠١ ج | Legislation And Contracts | 2 | 2 | 0 | 0 | First Semester |
| ١٤٠١ م | Field Training | 1 | 0 | 0 | 2 | First Semester |
| ١٤٣١ م | Combustion Technology | 3 | 3 | 2 | 1 | First Semester |
| ١٥٠٠ م | Project | 2 | 2 | | 6 | Second Semester |
| ١٤٨٢ م | Engineering Economy | 2 | 2 | | 1 | Second Semester |
| ١٤٥٢ م | Control Applications | 2 | 2 | 1 | 1 | Second Semester |

b- Optional :

| code | Course Title | No.of Units | No. of hours/week | | | Semester |
|--------|---|-------------|-------------------|--------|------|-----------------|
| | | | Lect. | Excer. | Lab. | |
| ١٥٢٥ م | Non Conventional Energy | 3 | 3 | 2 | 1 | First Semester |
| ١٥٤١ م | Industrial Refrigeration | 2 | 2 | 1 | 1 | First Semester |
| ١٥٤٤ م | Refrigeration and Air Conditioning Equipment | 3 | 3 | 2 | 1 | Second Semester |
| ١٥٤٢ م | Air Conditioning Systems | 3 | 3 | 2 | 1 | Second Semester |
| ١٥٢٢ م | Nuclear Power Stations-Nuclear Power Stations | 3 | 3 | 2 | 1 | Second Semester |
| ١٥٢٤ م | Computer Applications in Energy Systems | 3 | 3 | 2 | 1 | Second Semester |
| ١٥١٢ م | Fire Fighting and Water Distribution Systems | 3 | 3 | 2 | 1 | Second Semester |
| ١٥٣٤ م | Automotive Engineering-Automotive Engineering | 3 | 3 | 2 | 1 | Second Semester |

-Third Year / الأئحة الداخلية لكلية الهندسة بينها) القوى الميكانيكية / الهندسة الميكانيكية

a- Compulsory :

| code | Course Title | No.of Units | No. of hours/week | | | Semester |
|--------|-------------------------------------|-------------|-------------------|--------|------|-----------------|
| | | | Lect. | Excer. | Lab. | |
| ١٣٢١ م | Heat and Mass Transfer A | 3 | 3 | 2 | 1 | First Semester |
| ١٣٤١ م | Refrigeration and Air Conditioning | 3 | 3 | 2 | 1 | First Semester |
| ١٣٥١ م | System Dynamics and Vibrations | 3 | 3 | 2 | 1 | First Semester |
| ١٣١١ م | Fluid Dynamics-Fluid Dynamics | 3 | 3 | 2 | 1 | First Semester |
| ١٣٣١ م | Environment and Pollution | 1 | 1 | 1 | | First Semester |
| ١٣٦١ م | Mechanical Design-Mechanical Design | 3 | 3 | 2 | 1 | First Semester |
| ١٣٣٢ م | Internal Combustion Engines | 3 | 3 | 2 | 1 | Second Semester |
| ١٣٥٢ م | Automatic Control | 3 | 3 | 2 | 1 | Second Semester |

| | | | | | | |
|--------|------------------------------------|---|---|---|---|----------------|
| ١٣٠٠ م | Technical Report | 1 | 0 | 0 | 2 | Second Semster |
| ١٣٨٢ م | Industrial Engineering | 3 | 3 | 2 | 1 | Second Semster |
| ١٣٨٤ م | Production Management | 2 | 2 | 0 | 0 | Second Semster |
| ١٣٤٢ م | Refrigeration and Air Conditioning | 3 | 3 | 2 | 1 | Second Semster |
| ١٣٢٢ م | Heat and Mass Transfer B | 3 | 3 | 2 | 1 | Second Semster |

b- Optional :

-Preparatory Year (الائحة الداخلية لكلية الهندسة بينها)

a- Compulsory :

| code | Course Title | No.of Units | No. of hours/week | | | Semester |
|--------|---|-------------|-------------------|--------|------|-----------------|
| | | | Lect. | Excer. | Lab. | |
| ١٠٦١ م | Engineering Drawing A- Engineering Drawing A | 1 | | | 3 | First Semester |
| ١٠١١ س | Mathematics 1 A | 4 | 4 | 2 | 0 | First Semester |
| ١٠٣١ س | Physics A | 4 | 4 | - | 2 | First Semester |
| ١٠٤١ س | Chemistry A | 4 | 4 | 2 | 2 | First Semester |
| ١٠٢١ ك | Computer Fundamentals and Programming A | 1 | 0 | 0 | 2 | First Semester |
| ١٠١١ ج | Technical English Language A | 1 | | | 2 | First Semester |
| ١٠٧١ م | Production Engineering and Workshops A-Production Engineering and Workshops A | 2 | 2 | 0 | 3 | First Semester |
| ١٠٢١ س | Mechanics A | 4 | 4 | 2 | | First Semester |
| ١٠٠٢ م | Technology and Society- Technology and Society | 2 | 2 | | | Second Semester |
| ١٠٢٢ س | Mathematics 1 B-Mechanics B | 4 | 4 | 2 | | Second Semester |
| ١٠٤٢ س | Chemistry B | 4 | 4 | 2 | 2 | Second Semester |
| ١٠١٢ س | Mathematics 1 B | 4 | 4 | 2 | 0 | Second Semester |
| ١٠٢٢ ك | Computer Fundamentals and Programming B | 1 | 0 | 0 | 2 | Second Semester |
| ١٠١٢ ج | Technical English Language B | 1 | | | 2 | Second Semester |
| ١٠٧٢ م | Production Engineering and Workshops B | 2 | 2 | 0 | 3 | Second Semester |
| ١٠٣٢ س | Physics B | 4 | 4 | 0 | 2 | Second Semester |
| ١٠٦٢ م | Engineering Drawing B- Engineering Drawing B | 3 | | | 3 | Second Semester |

b- Optional :

-First Year / (الائحة الداخلية لكلية الهندسة بينها)

a- Compulsory :

| Code | Course Title | No.of Units | No. of hours/week | | | Semester |
|--------|--------------------------|-------------|-------------------|--------|------|----------------|
| | | | Lect. | Excer. | Lab. | |
| ١١١١ ج | Language-Language | 1 | | | 2 | First Semester |
| ١١٢٥ ك | Computer Applications A- | 1 | 0 | 0 | 2 | First Semester |

| | | | | | | |
|--------|---|---|---|---|---|-----------------|
| | Computer Applications A | | | | | |
| س ١١١١ | Mathematics 2 A | 3 | 3 | 2 | 0 | First Semester |
| م ١١٧١ | Principles of Manufacturing Workshop A-Principles of Manufacturing Workshop A | 2 | 2 | 0 | 3 | First Semester |
| م ١١٥١ | Theory of Machines A-Theory of Machines A | 3 | 3 | 1 | 1 | First Semester |
| م ١١١١ | Fluid Mechanics A | 3 | 3 | 1 | 1 | First Semester |
| د ١١٠٧ | Civil Engineering Technology | 3 | 3 | | 1 | First Semester |
| م ١١٦١ | Mechanics of Materials | 3 | 3 | 1 | 1 | First Semester |
| م ١١٦٣ | Mechanical Engineering Applications A-Mechanical Engineering Applications A | 1 | | | 1 | First Semester |
| ج ١١٢٢ | Human Rights | 2 | 2 | - | - | Second Semester |
| م ١١٦٤ | Mechanical Engineering Applications B-Mechanical Engineering Applications B | 2 | 0 | 0 | 3 | Second Semester |
| م ١١٦٢ | Materials Technology-Materials Technology | 3 | 3 | 1 | 1 | Second Semester |
| س ١١١٢ | Mathematics 2 B | 3 | 3 | 2 | 0 | Second Semester |
| م ١١٥٢ | Theory of Machines B-Theory of Machines B | 3 | 3 | 1 | 1 | Second Semester |
| م ١١١٢ | Fluid Mechanics B | 3 | 3 | 1 | 1 | Second Semester |
| م ١١٧٢ | Principles of Manufacturing Workshop B-Principles of Manufacturing Workshop B | 3 | 3 | 2 | 1 | Second Semester |
| ك ١١٢٦ | Computer Applications B-Computer Applications B | 2 | 0 | 0 | 4 | Second Semester |

b- Optional :

-Second Year / (الإثحة الداخلية لكلية الهندسة بينها) الهندسه الميكانيكيه

a- Compulsory :

| code | Course Title | No.of Units | No. of hours/week | | | Semester |
|--------|---|-------------|-------------------|--------|------|----------------|
| | | | Lect. | Excer. | Lab. | |
| م ١٢٨٣ | Industrial Safety-Industrial Safety | 2 | 2 | 0 | 0 | First Semester |
| ك ١٢٠٩ | Electrical and Electronic Circuits-Electrical and Electronic Circuits | 2 | 2 | 1 | 1 | First Semester |
| س ١٢١٣ | Mathematics 3 A-Mathematics 3 A | 3 | 3 | 2 | | First Semester |
| م ١٢٢١ | Thermodynamics A-Thermodynamics A | 3 | 3 | 1 | 1 | First Semester |
| م ١٢٨١ | Mechanical Systems Maintenance A-Mechanical Systems Maintenance A | 1 | | | 2 | First Semester |

| | | | | | | |
|--------|---|---|---|---|---|-----------------|
| ١٢٥١ م | Measurement Devices- Measurement Devices | 3 | 3 | 1 | 2 | First Semester |
| ١٢٦٣ م | Computer Aided Drafting A | 1 | 0 | 0 | 2 | First Semester |
| ١٢٦١ م | Mechanics and Testing of Materials-Mechanics and Testing of Materials | 2 | 2 | 1 | 1 | First Semester |
| ١٢٧١ م | Manufacturing Technology A- Manufacturing Technology A | 2 | 2 | 1 | 1 | First Semester |
| ١٢٨٤ م | Psychology in Industry- Psychology in Industry | 2 | 2 | 0 | 0 | Second Semester |
| ١٢٢٢ م | Thermodynamic B- Thermodynamic B | 3 | 3 | 1 | 1 | Second Semester |
| ١٢١٤ م | Mathematics 3 B | 3 | 3 | 2 | | Second Semester |
| ١٢٨٢ م | Mechanical Systems Maintenance B-Mechanical Systems Maintenance B | 2 | | | 4 | Second Semester |
| ١٢٦٤ م | Computer Aided Drafting B | 1 | 0 | 0 | 2 | Second Semester |
| ١٢٣٨ م | Electrical Power and Machines | 3 | 3 | 2 | 1 | Second Semester |
| ١٢٧٢ م | Manufacturing Technology B- Manufacturing Technology B | 2 | 2 | 1 | 1 | Second Semester |
| ١٢٦٢ م | Design of Machine Elements- Design of Machine Elements | 3 | 3 | 0 | 5 | Second Semester |

b- Optional :

7- Programme admission requirements

- 1- By-law graduated students from secondary schools (Branch of Mathematics) are distributed into all Egyptian Faculties of Engineering according to the score of each student.
- 2- Student from Technical Secondary Schools (or medium Technical Institutes) can attend this program as per Egyptian Law

8- Regulations for progression and programme completion

Benha university|Faculty of Engineering at benha|الميكانيكية|القوى الميكانيكية|Fourth Year

- 1- The student is considered successful if he/she passes the tests in all courses of his class.,The student is promoted to the next higher level if he/she successes or fail in no more than two subjects including those in the previous classes.,Student is graduated only if passes successfully all courses including subjects in humanities and social sciences either in regular term (July) or in external term (September). ,Every student re-examines any course will receive only path grade upon successfully path this subject, while student that was absent with acceptable reason can get his actual grade. ,Successful student grades are named as percent of the total mark as follows: (i) Excellent for score from and higher than 85%, (ii) Very good for score from 75% up to less than 85%, (iii) Good for score from 65% up to less than 75%, and (iv) Pass for score from 50% up to less than 65%,Failed students receive unsuccessful grades as follows: (i) Weak for score from 30% up to less than 50% of the total mark, (ii) Very Weak for score less than 30% of the total mark.,The BSc general grade is determined based on the cumulative marks obtained during all years of the study. The students are rearranged according to these Cumulative scores. ,Graduated students are

awarded honor degree if their grade is at least Very Good every year of his study other than Preparatory Year.

Benha university|Faculty of Engineering at benha|الميكانيكية|القوى الميكانيكية|Third Year

- 2- The student is considered successful if he/she passes the tests in all courses of his class, The student is promoted to the next higher level if he/she succeeds or fail in no more than two subjects including those in the previous classes, Every student re-examines any course will receive only path grade upon successfully path this subject, while student that was absent with acceptable reason can get his actual grade, Successful student grades are named as percent of the total mark as follows: (i) Excellent for score from and higher than 85%, (ii) Very good for score from 75% up to less than 85%, (iii) Good for score from 65% up to less than 75%, and (iv) Pass for score from 50% up to less than 65%, Failed students receive unsuccessful grades as follows: (i) Weak for score from 30% up to less than 50% of the total mark, (ii) Very Weak for score less than 30% of the total mark

Benha university|Faculty of Engineering at benha|Preparatory Year

- 3- The student is considered successful if he/she passes the tests in all courses of his class., The student is promoted to the next higher level if he/she succeeds or fail in no more than two subjects, Every student re-examines any course will receive only path grade upon successfully path this subject, while student that was absent with acceptable reason can get his actual grade, Successful student grades are named as percent of the total mark as follows: (i) Excellent for score from and higher than 85%, (ii) Very good for score from 75% up to less than 85%, (iii) Good for score from 65% up to less than 75%, and (iv) Pass for score from 50% up to less than 65%, Failed students receive unsuccessful grades as follows: (i) Weak for score from 30% up to less than 50% of the total mark, (ii) Very Weak for score less than 30% of the total mark, Student has had to leave faculty if he failed to pass more than two courses from previously failed course from the Preparatory Year Courses.

Benha university|Faculty of Engineering at benha|الميكانيكية|الهندسة الميكانيكية|First Year

- 4- The student is considered successful if he/she passes the tests in all courses of his class, The student is promoted to the next higher level if he/she succeeds or fail in no more than two subjects including those in the previous classes, Every student re-examines any course will receive only path grade upon successfully path this subject, while student that was absent with acceptable reason can get his actual grade, Successful student grades are named as percent of the total mark as follows: (i) Excellent for score from and higher than 85%, (ii) Very good for score from 75% up to less than 85%, (iii) Good for score from 65% up to less than 75%, and (iv) Pass for score from 50% up to less than 65%, Failed students receive unsuccessful grades as follows: (i) Weak for score from 30% up to less than 50% of the total mark, (ii) Very Weak for score less than 30% of the total mark

Benha university|Faculty of Engineering at benha|الميكانيكية|الهندسة الميكانيكية|Second Year

- 5- The student is considered successful if he/she passes the tests in all courses of his class, The student is promoted to the next higher level if he/she succeeds or fail in no more than two subjects including those in the previous classes, Every student re-examines any course will receive only path grade upon successfully path this subject, while student that was absent with acceptable reason can get his actual grade, Successful student grades are named as percent of the total mark as follows: (i) Excellent for score from and higher than 85%, (ii) Very good for score from 75% up to less than 85%, (iii) Good for score from 65% up to less than 75%, and (iv) Pass for score from 50% up to less than 65%, Failed students receive unsuccessful grades as follows: (i) Weak for score from 30% up to less than 50% of the total mark, (ii) Very Weak for score less than 30% of the total mark

9- Assessment rules enrolled in the program

| No | Method | As measured from the intended learning outcomes |
|----|-----------------------------------|--|
| 1- | Written Exams | Knowledge&Understanding skills, Intellectual skills, Practical&Professional Skills |
| 2- | Practical Exercises & Assignments | Knowledge&Understanding skills, Practical&Professional Skills, General &Transferable Skills |
| 3- | Quizzes | Knowledge&Understanding skills, Intellectual skills |
| 4- | Oral Exams | Knowledge&Understanding skills, Intellectual skills, Practical&Professional Skills, General &Transferable Skills |
| 5- | Reports, Presentation, Discussion | Knowledge&Understanding skills, Intellectual skills, Practical&Professional Skills, General &Transferable Skills |

10- Methods of assessment program

| No | Evaluator | Tool | Sample |
|----|-----------------------------|----------------------------------|--------|
| 1- | 1- Senior Students | Quationair & Feedback | |
| 2- | 2- Alumni | Quationair | |
| 3- | 3- Stakeholders (Employers) | Quationair | |
| 4- | 4- External Evaluator | Review Specs and ILOS of Prohram | |
| 5- | 5- Others | | |

11- Matrix of knowledge and skills

-Fourth Year / الأئحة الداخلية لكلية الهندسة بينها) القوى الميكانيكية / الهندسه الميكانيكية

| a- Compulsory : | | | | | |
|-----------------|-----------------------------|----------------------------------|---------------------------------|-------------------------------|--|
| No | Course Title | Knowledge and Understanding | Intellectual capacity | Professional skills | General Skills |
| 1- | Project | a1,P0a2 | b1,b2 | c2,c8 | d1,d2,P0d1,P0d2,P0d3,P0d4,P0d5,P0d6,P0d7,P0d8,P0d9 |
| 2- | Power Systems Components | a5,a6,a7,a2 | b1,b2,b5 | c6,c7 | d1,d2 |
| 3- | Hydraulic and Turbomachines | a2 | b1,b4 | | d1,d2 |
| 4- | Power Stations | a2,a4,a5,a6 | b1,b2,b4 | c4,c7 | d1,d2 |
| 5- | Legislation And Contracts | Course do not need specification | | | |
| 6- | Field Training | Course do not need specification | | | |
| 7- | Combustion Technology | P0a1,P0a3,P0a5,P0a10,P0a11,a1,a7 | P0b2,P0b3,P0b4,P0b5,P0b10,b1,b2 | c4,P0c1,P0c2,P0c8,P0c11,P0c12 | P0d1,P0d3,P0d5,P0d7,P0d9,d2 |
| 8- | Project | Course do not need specification | | | |
| 9- | Engineering Economy | Course do not need specification | | | |
| 10- | Control Applications | a6,a7 | b1 | c3 | d1,d2 |
| b- Optional : | | | | | |
| No. | Course Title | Knowledge and Understanding | Intellectual capacity | Professional skills | General Skills |
| 11- | Non Conventional Energy | a1,a4,a5,a8 | b1,b3,b6 | c4,c7,c8 | d1 |

| | | | | | |
|-----|--|--|-------------------------------|--|----------------------------------|
| 12- | Industrial Refrigeration | a1,a3,a4,a6,a8 | b1,b2,b3 | c4,c7,c8 | d1,d2 |
| 13- | Refrigeration and Air Conditioning Equipment | a1,a2,a3,a6 | b1,b2,b3,b5,b6 | c1,c2,c5,c7,c8 | d1,d2 |
| 14- | Air Conditioning Systems | a1,a3,a4,a5,a7,a8 | b1,b5 | c2,c5,c6,c8 | d1,d2 |
| 15- | Nuclear Power Stations | a4,a6,P0a4,P0a8 | b1,P0b3,P0b4 | c4,c7,P0c1,P0c2 | d1,d2,P0d1,P0d2 |
| 16- | Computer Applications in Energy Systems | Course do not need specification | | | |
| 17- | Fire Fighting and Water Distribution Systems | a1,a2,a3,a4,a7,a8,P0a1,P0a3,P0a4,P0a5,P0a6,P0a7,P0a8,P0a10 | b1,b3,b4,b5,b6,P0b1,P0b3,P0b9 | c1,c2,c5,c8,P0c1,P0c2,P0c8,P0c10,P0c11,P0c12 | d2,P0d1,P0d2,P0d3,P0d5,P0d6,P0d9 |
| 18- | Automotive Engineering | a1,a2,a3,a5,a7,P0a10,P0a12 | b1,b4,b5,P0b5,P0b7,P0b12 | c1,c2,c5,P0c8,P0c11,P0c12 | d1,P0d1,P0d2,P0d7,P0d8 |

(الإثحة الداخلية لكلية الهندسة بينها) القوى الميكانيكية / الهندسة الميكانيكية / Third Year

a- Compulsory :

| No. | Course Title | Knowledge and Understanding | Intellectual capacity | Professional skills | General Skills |
|-----|------------------------------------|--|--|---|--------------------------------|
| 1- | Heat and Mass Transfer A | a1,a4,a7,P0a1,P0a3,P0a4,P0a5,P0a10,P0a11 | b1,b6,P0b1,P0b2,P0b3,P0b4,P0b5,P0b9 | c2,c4,c8,P0c1,P0c7,P0c12,P0c2 | d2,P0d6,P0d9 |
| 2- | Refrigeration and Air Conditioning | a1,a3,a4,a6,a7,a8 | b1,b2,b3,b5,b6 | c4,c5,c7,c8 | d1,d2 |
| 3- | System Dynamics and Vibrations | Course do not need specification | | | |
| 4- | Fluid Dynamics | a1,a6,P0a1,P0a4 | b1,P0b4,P0b2 | c4,P0c1,P0c5 | d2,P0d1,P0d2,P0d9 |
| 5- | Environment and Pollution | Course do not need specification | | | |
| 6- | Mechanical Design | a2,P0a1,P0a3,P0a4,P0a8 | P0b3,P0b4,P0b9,P0b10 | c2,c8,P0c2,P0c3,P0c4,P0c12 | d2,P0d1,P0d7,P0d9 |
| 7- | Internal Combustion Engines | P0a1,P0a3,P0a5,P0a10,P0a11,a1,a2,a6,a7 | P0b2,P0b3,P0b4,P0b5,P0b7,P0b9,P0b10,b1,b3,b4 | P0c2,P0c8,P0c10,P0c11,P0c12,c4,c7,c6,P0c1 | P0d1,P0d3,P0d5,P0d7,P0d9,d1,d2 |
| 8- | Automatic Control | Course do not need specification | | | |
| 9- | Technical Report | Course do not need specification | | | |
| 10- | Industrial Engineering | a4,a5,a7,a8 | b1,b2,b6 | c3,c8 | d2 |
| 11- | Production Management | Course do not need specification | | | |
| 12- | Refrigeration and Air Conditioning | a1,a3,a4,a6,a7,a8 | b1,b3,b5,b6 | c5,c7,c8 | d1,d2 |

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|-----|--------------------------|---|-------------------------------------|-------------------------------|--------------|
| 13- | Heat and Mass Transfer B | a1,a4,a5,P0a1,P0a3,P0a4,P0a5,P0a10,P0a11,a7 | b1,b6,P0b1,P0b2,P0b3,P0b4,P0b5,P0b9 | c2,c4,c8,P0c1,P0c7,P0c12,P0c2 | d2,P0d6,P0d9 |
|-----|--------------------------|---|-------------------------------------|-------------------------------|--------------|

b- Optional :

-Preparatory Year (اللائحة الداخلية لكلية الهندسة بينها)

a- Compulsory :

| No. | Course Title | Knowledge and Understanding | Intellectual capacity | Professional skills | General Skills |
|-----|--|----------------------------------|--|----------------------|--------------------------|
| 1- | Engineering Drawing A | P0a2,P0a4,P0a8,P0a10 | P0b4,P0b12 | P0c2,P0c3,P0c4,P0c11 | P0d1,P0d2,P0d3,P0d7 |
| 2- | Mathematics 1 A | P0a1,P0a5 | P0b1,P0b2,P0b7 | P0c1 | P0d7 |
| 3- | Physics A | P0a1,P0a3 | P0b2 | P0c1,P0c5 | P0d1,P0d9 |
| 4- | Chemistry A | P0a1,P0a3 | P0b1,P0b5 | P0c1 | P0d1,P0d9 |
| 5- | Computer Fundamentals and Programming A- Computer Fundamentals and Programming A | P0a1,P0a2,P0a5,P0a8 | P0b1,P0b2,P0b3,P0b4,P0b6,P0b7,P0b8,P0b12 | P0c1,P0c3,P0c5,P0c11 | P0d4,P0d5,P0d6,P0d7,P0d9 |
| 6- | Technical English Language A | Course do not need specification | | | |
| 7- | Production Engineering and Workshops A | P0a3,P0a6,P0a4,P0a5 | P0b2,P0b5 | P0c2,P0c8,P0c10 | P0d1,P0d3,P0d5 |
| 8- | Mechanics A | P0a5,P0a1 | P0b2,P0b3,P0b1 | P0c1 | P0d1 |
| 9- | Technology and Society | P0a6,P0a7,P0a9 | P0b9,P0b10 | P0c10 | P0d2 |
| 10- | Mathematics 1 B | P0a5,P0a1 | P0b2,P0b3,P0b1 | P0c1 | P0d1 |
| 11- | Chemistry B | P0a1,P0a3 | P0b1,P0b2,P0b4 | P0c1,P0c5,P0c8 | P0d1 |
| 12- | Mathematics 1 B | P0a1,P0a5 | P0b1,P0b2,P0b7 | P0c1 | P0d7 |
| 13- | Computer Fundamentals and Programming B | P0a1,P0a2,P0a5,P0a8,P0a10 | P0b1,P0b2,P0b5,P0b7,P0b8,P0b12 | P0c1,P0c3,P0c5,P0c10 | P0d1,P0d4,P0d7,P0d9 |
| 14- | Technical English Language B | Course do not need specification | | | |
| 15- | Production Engineering and Workshops B | Course do not need specification | | | |
| 16- | Physics B | P0a1,P0a3 | P0b2 | P0c1,P0c5 | P0d1,P0d9 |
| 17- | Engineering Drawing | P0a2,P0a4,P0a8,P0a10 | P0b4,P0b12 | P0c2,P0c3,P0c4,P0c11 | P0d1,P0d2,P0d3,P0d7 |

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|---|---------|---------|----------|
| B | 8,P0a10 | 4,P0c11 | 0d3,P0d6 |
|---|---------|---------|----------|

b- Optional :

-First Year / (اللائحة الداخلية لكلية الهندسة بينها) الهندسه الميكانيكيه

a- Compulsory :

| No. | Course Title | Knowledge and Understanding | Intellectual capacity | Professional skills | General Skills |
|-----|--|----------------------------------|-----------------------|----------------------------|---------------------------------------|
| 1- | Language | P0a10 | P0b4 | P0c12 | P0d1,P0d2, P0d4,P0d5, P0d6,P0d7, P0d9 |
| 2- | Computer Applications A | P0a5,P0a8,P0a12 | P0b1,P0b3 | P0c5,P0c6,P0c1,P0c2 | P0d4,P0d6, P0d7 |
| 3- | Mathematics 2 A | P0a1,P0a5 | P0b1,P0b2,P0b3, P0b7 | P0c1 | P0d7 |
| 4- | Principles of Manufacturing Workshop A | P0a1,P0a3,P0a8,P0a9,P0a10 | b1,P0b6 | | P0d1,P0d5 |
| 5- | Theory of Machines A | P0a1,P0a3,P0a4,P0a5 | P0b1,P0b2,P0b3 | P0c1,P0c2,P0c3 | P0d1,P0d2, P0d3 |
| 6- | Fluid Mechanics A | P0a1,P0a3,P0a5,P0a8,P0a9,P0a12 | P0b1,P0b2,P0b3, P0b4 | P0c1,P0c5 | P0d2,P0d5, P0d8 |
| 7- | Civil Engineering Technology | Course do not need specification | | | |
| 8- | Mechanics of Materials | P0a1,P0a2,P0a3,P0a4 | P0b7,P0b2,P0b3, P0b6 | P0c1,P0c4,P0c5 | P0d1,P0d6, P0d7,P0d9 |
| 9- | Mechanical Engineering Applications A | P0a4,P0a6,P0a8 | P0b3,P0b4,P0b9 | P0c5,P0c6,P0c12 | d2,P0d1,P0d6,P0d9 |
| 10- | Human Rights | P0a9 | P0b4 | | |
| 11- | Mechanical Engineering Applications B | a7,P0a4,P0a6, P0a8,P0a10 | P0b3,P0b4,P0b9 | P0c5,P0c8 | d2,P0d1,P0d2,P0d6 |
| 12- | Materials Technology | | | | d2 |
| 13- | Mathematics 2 B | P0a1,P0a5 | P0b1,P0b2,P0b7 | P0c1 | |
| 14- | Theory of Machines B | P0a1,P0a3,P0a4,P0a5,P0a10 | P0b1,P0b2,P0b3, P0b5 | P0c1,P0c2,P0c3,P0c10,P0c11 | P0d1,P0d2, P0d3,P0d7 |
| 15- | Fluid Mechanics B | P0a1,P0a3,P0a5,P0a8 | P0b1,P0b2,P0b3, P0b4 | P0c1,P0c5 | P0d2,P0d5, P0d8 |
| 16- | Principles of Manufacturing Workshop B | P0a4,P0a8 | P0b6,P0b7,P0b9 | P0c6 | d1,P0d1,P0d2,P0d6 |
| 17- | Computer Applications B | P0a5,P0a8,P0a12 | P0b1,P0b3 | P0c1,P0c2,P0c5,P0c6 | P0d4,P0d6, P0d7 |

b- Optional :

-Second Year / (الإثحة الداخلية لكلية الهندسة بينها) الهندسه الميكانيكيه

a- Compulsory :

| No. | Course Title | Knowledge and Understanding | Intellectual capacity | Professional skills | General Skills |
|-----|------------------------------------|----------------------------------|---|--|---|
| 1- | Industrial Safety | a8,P0a6,P0a8,P0a10,P0a11 | P0b6,P0b9,P0b12,b6 | c1,c7,P0c2,P0c8,P0c9,P0c10,P0c11,P0c12 | d2,P0d2,P0d3,P0d5,P0d6,P0d7,P0d9,P0d1 |
| 2- | Electrical and Electronic Circuits | P0a4,P0a5,P0a10,P0a12 | P0b1,P0b2,P0b3,P0b4,P0b5,P0b11 | c1,P0c6,P0c9,P0c11,P0c12 | P0d3,P0d6,P0d8,P0d9 |
| 3- | Mathematics 3 A | P0a1,P0a5 | P0b1,P0b2,P0b7 | P0c1,P0c7 | P0d7 |
| 4- | Thermodynamics A | P0a1,P0a5,P0a8,P0a10,P0a11 | P0b2,P0b3,P0b4,P0b5,P0b7,P0b9,P0b11 | P0c1,P0c5,P0c6,P0c11 | P0d1,P0d2,P0d5,P0d6,P0d7 |
| 5- | Mechanical Systems Maintenance A | P0a8,P0a10 | P0b5,P0b6 | P0c5,P0c6,P0c10 | P0d1,P0d3,P0d7 |
| 6- | Measurement Devices | P0a1,P0a4,P0a5,P0a8 | P0b2,P0b3,P0b5 | P0c1,P0c2,P0c5 | P0d1,P0d2,P0d9 |
| 7- | Computer Aided Drafting A | P0a12 | P0b3 | P0c6 | P0d1 |
| 8- | Mechanics and Testing of Materials | P0a1,P0a3,P0a4,P0a5,P0a8,P0a12 | P0b1,P0b2,P0b3,P0b4,P0b5,P0b6,P0b7,P0b9,P0b10 | P0c1,P0c2,P0c3,P0c4,P0c5,P0c6,P0c9,P0c10,P0c11,P0c12 | P0d1,P0d2,P0d3,P0d5,P0d6,P0d7,P0d8,P0d9 |
| 9- | Manufacturing Technology A | P0a3,P0a8,P0a12,P0a4 | P0b3,P0b4,P0b9 | P0c1,P0c2 | P0d2,P0d9 |
| 10- | Psychology in Industry | P0a5,P0a9,P0a11 | P0b9,P0b10 | P0c8,P0c10,P0c11 | d1,P0d2,P0d5,P0d9 |
| 11- | Thermodynamic B | P0a1,P0a4,P0a5,P0a8,P0a10,P0a11 | P0b2,P0b3,P0b4,P0b5,P0b7,P0b9,P0b11 | P0c1,P0c5,P0c6,P0c11 | P0d1,P0d2,P0d5,P0d6,P0d7 |
| 12- | Mathematics 3 B | P0a1,P0a5 | P0b1,P0b2,P0b7 | P0c1,P0c7 | P0d7 |
| 13- | Mechanical Systems Maintenance B | P0a6,P0a8,P0a10,P0a12,P0a2,P0a3 | P0b5,P0b6,P0b9,P0b12,P0b4 | P0c5,P0c6,P0c8,P0c11,P0c12,P0c1 | P0d1,P0d2,P0d5,P0d7 |
| 14- | Computer Aided Drafting B | Course do not need specification | | | |
| 15- | Electrical Power and Machines | Course do not need specification | | | |
| 16- | Manufacturing Technology B | P0a3,P0a4,P0a8,P0a12 | P0b3,P0b4,P0b9 | P0c1,P0c2,P0c11 | P0d2,P0d9 |

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|---------------|----------------------------|--------------------------|------------------------------|----------------|------------------------------|
| 17- | Design of Machine Elements | P0a2,P0a3,P0a4, P0a10 | P0b1,P0b2,P0b3, P0b6,P0b7 | P0c1,P0c2,P0c3 | P0d1,P0d2,P0d4, P0d6,P0d9 |
| b- Optional : | | | | | |

Program Coordinators :

Ali Mahmoud Ali Attia

Open Description