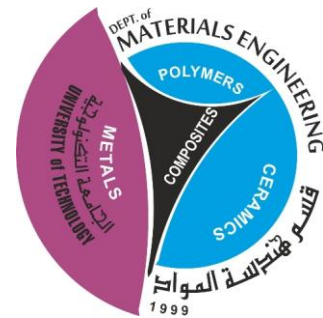


Republic of Iraq
Ministry of Higher Education & Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation
International Accreditation Dept.



Academic Program Specification Form For The Academic Year 2015-2016

University: Technology

College : Materials Engineering

Number Of Departments In The College : Three

Date Of Form Completion : 1-9-2015

Dean's Name :

*Dean's Assistant For Scientific
Affairs*

*The College Quality Assurance
And University Performance
Manager*

*Assist.Prof. Dr. Jawad
Kadhim Oleiwi*

Date : 1 / 9 / 2015

Signature: j. K. O.

*Assist.Prof. Dr. Farhad M.
Othman*

Date : 1 / 9 / 2015

Signature: F. M. A

Dr. Ayad K. Hassan

Date : 1 / 9 / 2015

Signature: A. K. H.

PROGRAMME SPECIFICATION

PROGRAMME SPECIFICATION: Materials Engineering Department

PROGRAMME SPECIFICATION

The programme prepared high level education to apply advanced science engineering principles to different materials systems, e.g. ceramics, metals, polymers, composite materials. the programme aims to integrate the understanding of the four major elements of the field: structure, properties, processing, and performance with the scientific and engineering principles related to material systems. Also the programme the knowledge from each of the above four elements of the field to solve materials selection and design problems, and; to utilize experimental, statistical, and computational methods consistent with the program educational objectives.

| | |
|---|----------------------------------|
| 1. Teaching Institution | University of Technology |
| 2. University Department/Centre | Materials Engineering Department |
| 3. Program Title | Materials Engineering (MaE) |
| 4. Title of Final Award | B.Sc. Materials Engineering |
| 5. Modes of Attendance offered | Annual, courses |
| 6. Accreditation | ABET |
| 7. Other external influences | no |
| 8. Date of production/revision of this specification | 1/9/2015 |
| 9. Aims of the Program | |
| Objective#1: Graduate elite engineers have ability to understand the relationship between structure, properties, applications and performance of engineering materials to develop the industry in country. | |
| Objective#2: Graduate engineers able to create suitable solutions for engineering problems related with contemporary issues in different applied and industrial fields through working in multidisciplinary teams to solve these problems. | |

Objective#3: Graduate engineers with good skills to do analysis and characterization for different engineering materials by using recent devices and techniques.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

- A1.** Understanding metallic materials and non-metallic structures.
- A2.** Understanding chemical and physical properties of metallic and non-metallic materials.
- A3.** Understand computer architect
- A4.** Understand Allocation techniques
- A5.** Understand the operating system, basic tasks, memory storage and management
- A6.** Understanding of the importance of manufacturing process to the economy and design.

B. Subject-specific skills

- B1.** Classified metallic and non-metallic materials..
- B2.** Heat treatments for aluminum , magnesium and copper alloys and ceramics materials
- B3.** Use the drawing instruments; draw two dimensional drawings, isometric drawings.
- B4.** Present with basic skills for 2-D and 3-D vectors and concept of force, moment and equilibrium.
- B5.** Formulate and solve elementary mechanical engineering problems.
- B6.** Think logically and derive conclusions deductively.
- B7.** Perform stress analysis and design using several methods.
- B8.** Thermochemical processing treatment of materials.
- B9.** Solve the problems of production planning and control in production organizations.
- B10.** Solve the mathematical problems accompanying with engineering applications.
- B11.** Ability to fit an experimental data.

Teaching and Learning Methods

Through the presentation of a theoretical explanation with the aid of white board and 'Data Show', to illustrate syllabus (examples and exercises) and using text books.

Assessment methods

- 1-Written examination :To assess knowledge , understanding and skills (First half of the academic year , Mid-year exam, Second half of the academic year, final exam the academic year) .
- 2- Oral examination: To assess knowledge, skills and intellectual functions, and attitude.
- 3-Assignments & other activities.
- 4-Quizzes (Shock exams).
- 5-homework.

C. Thinking Skills

- C1. Reading, Writing, Speaking and Listening for English language
- C2. Apply mathematics to everyday life problems.
- C3. Recognize the uses of commands in programs
- C4. Distinguishes between design – code – run parts and use different objects in creating the programs and understand algorithms, language abilities and reasons to use
- C5. Distinguishes between surface flaws and recognize between types of surface inspections.
- C6. Observe the methods of surface inspections and identify the best inspection method.
- C7. Solve welding metallurgy problems at the HAZ .
- C8. Design strategy of materials and selection of materials for design

Teaching and Learning Methods

- 1- Lectures using white board and data show
- 2- Experimental part
- 3- Discussion about the practical application

Assessment methods

- 1 -written examination
- 2- oral examination
- 3- quizzes
- 4 - homework
- 5- report

- D. General and Transferable Skills (other skills relevant to employability and personal development)
- D1. the impact of engineering solutions in a global, economic, environmental, and societal context
 - D2. Understand the phase transformations through fusion welding process.
 - D3. Analyze the experimental data and parts by using software package.
 - D4. Recognize and select the best composite depend on application.
 - D5. Ability to failure analysis for engineering structures due to mechanical stresses.
 - D6. Crack propagation for structures.
 - D7. Identify, formulate, and solve engineering problems.
 - D8. Correlate surface methods to achieved properties.
 - D9. Effecting of solidification on castings properties.
 - D10. Use his written and acquaintances and rhetorical and organizational research.
 - D11. Opportunity to apply ethics before joining actually work.

Teaching and Learning Methods

Through the presentation of a theoretical explanation with the aid of white board and 'Data Show', to illustrate syllabus (examples and exercises) and using text books.

General Materials Engineering Program Curriculum

Table (5-5): First Class – 1st Course

| Code | Subject | Weekly hours | | | Units |
|---------------------|--|--------------|----|---|-------|
| | | First Course | | | |
| | | *Th | P | T | |
| MaEG111 | Principles of engineering metallic materials | 3 | 1 | 0 | 3.5 |
| MaEG112 | Principles of computer science | 2 | 2 | 0 | 3 |
| MaEG113 | Engineering and mechanical drawing I | 0 | 6 | 0 | 3 |
| MaEG114 | Workshops | 0 | 4 | 0 | 2 |
| MaEG115 | Mathematics I | 2 | 0 | 1 | 2 |
| MaEG116 | Engineering mechanic / Static | 2 | 0 | 1 | 2 |
| MaEG117 | Technical English language I | 2 | 0 | 0 | 2 |
| MaEG118 | Human rights | 1 | 0 | 0 | 1 |
| No. of Weekly hours | | 12 | 13 | 2 | |
| Total | | 27 | | | 18.5 |

Table (5-5): First Class – 2nd Course

| Code | Subject | Weekly hours | | | Units |
|---------------------|--|--------------|----|---|-------|
| | | First Course | | | |
| | | *Th | P | T | |
| MaEG111 | Principles of engineering metallic materials | 3 | 1 | 0 | 3.5 |
| MaEG112 | Principles of computer science | 2 | 2 | 0 | 3 |
| MaEG113 | Engineering and mechanical drawing I | 0 | 6 | 0 | 3 |
| MaEG114 | Workshops | 0 | 4 | 0 | 2 |
| MaEG115 | Mathematics I | 2 | 0 | 1 | 2 |
| MaEG116 | Engineering mechanic / Static | 2 | 0 | 1 | 2 |
| MaEG117 | Technical English language I | 2 | 0 | 0 | 2 |
| MaEG118 | Human rights | 1 | 0 | 0 | 1 |
| No. of Weekly hours | | 12 | 13 | 2 | |
| Total | | 27 | | | 18.5 |

Where: MaE = Materials Engineering, Th = Theoretical Hours, P= Practical (laboratory) Hours and T = Tutorial Hours

Second Class (Total No. of Units: 38)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|---------------------------|--------------|---|---|-------------|---|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE211 | Engineering Metallurgy | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE212 | Mathematics II. | 3 | - | 1 | 3 | - | 1 | 6 |
| MaE213 | Programming. | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE214 | Manufacturing processes I | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE215 | Strength of Materials. | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE216 | Heat Transfer and Fluids. | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE217 | Chemical Metallurgy. | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| No. of Weekly hours | | 15 | 8 | 3 | 15 | 8 | 3 | |
| Total | | 26 | | | 26 | | | 38 |

Third Class (Total No. of Units: 46)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|---|--------------|----|---|-------------|----|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE311 | Inspection and Characterization of Engineering Materials. | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE312 | Powder Metallurgy. | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE313 | Material Corrosion | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE314 | Heat Treatment and Phase Transformation | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE315 | Manufacturing processes II | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE316 | Welding Metallurgy. | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE317 | Engineering and Numerical Analyses | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE318 | Extraction metallurgy | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE319 | Nanotechnology | 2 | 1 | - | 2 | 1 | - | 5 |
| No. of Weekly hours | | 18 | 10 | 3 | 18 | 10 | 3 | |
| Total | | 31 | | | 31 | | | 46 |

Fourth Class (Total No. of Units: 35)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|-------------------------------------|--------------|---|---|-------------|---|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE411 | Materials Engineering Design. | 3 | - | 1 | 3 | - | 1 | 6 |
| MaE412 | Composite Materials Engineering | 3 | 1 | 1 | 3 | 1 | 1 | 5 |
| MaE413 | Failure Analyses | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE414 | Surface Engineering | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE415 | Casting Technology | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE416 | Graduation Project | 1 | 3 | - | 1 | 3 | - | 5 |
| MaE417 | Selection of Engineering Materials. | 2 | - | 1 | 2 | - | 1 | 4 |
| No. of Weekly hours | | 14 | 7 | 3 | 14 | 7 | 3 | |
| Total | | 24 | | | 24 | | | 35 |

Ceramics and Building Materials Engineering program Curriculum

First Class – 1st Course

| Code | Subject | Weekly hours | | | Units |
|---------------------|--|--------------|----|---|-------|
| | | First Course | | | |
| | | *Th | P | T | |
| MaEG111 | Principles of engineering metallic materials | 3 | 1 | 0 | 3.5 |
| MaEG112 | Principles of computer science | 2 | 2 | 0 | 3 |
| MaEG113 | Engineering and mechanical drawing I | 0 | 6 | 0 | 3 |
| MaEG114 | Workshops | 0 | 4 | 0 | 2 |
| MaEG115 | Mathematics I | 2 | 0 | 1 | 2 |
| MaEG116 | Engineering mechanic / Static | 2 | 0 | 1 | 2 |
| MaEG117 | Technical English language I | 2 | 0 | 0 | 2 |
| MaEG118 | Human rights | 1 | 0 | 0 | 1 |
| No. of Weekly hours | | 12 | 13 | 2 | |
| Total | | 27 | | | 18.5 |

First Class – 2nd Course

| Code | Subject | Weekly hours | | | Units |
|---------------------|--|--------------|----|---|-------|
| | | First Course | | | |
| | | *Th | P | T | |
| MaEG111 | Principles of engineering metallic materials | 3 | 1 | 0 | 3.5 |
| MaEG112 | Principles of computer science | 2 | 2 | 0 | 3 |
| MaEG113 | Engineering and mechanical drawing I | 0 | 6 | 0 | 3 |
| MaEG114 | Workshops | 0 | 4 | 0 | 2 |
| MaEG115 | Mathematics I | 2 | 0 | 1 | 2 |
| MaEG116 | Engineering mechanic / Static | 2 | 0 | 1 | 2 |
| MaEG117 | Technical English language I | 2 | 0 | 0 | 2 |
| MaEG118 | Human rights | 1 | 0 | 0 | 1 |
| No. of Weekly hours | | 12 | 13 | 2 | |
| Total | | 27 | | | 18.5 |

Where: MaE = Materials Engineering, Th = Theoretical Hours, P= Practical (laboratory) Hours and T = Tutorial Hours

Second Class (Total No. of Units: 38)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|---------------------------|--------------|---|---|-------------|---|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE211 | Engineering Metallurgy | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE212 | Mathematics II. | 3 | - | 1 | 3 | - | 1 | 6 |
| MaE213 | Programming. | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE214 | Manufacturing processes I | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE215 | Strength of Materials. | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE216 | Heat Transfer and Fluids. | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE217 | Chemical Metallurgy. | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| No. of Weekly hours | | 15 | 8 | 3 | 15 | 8 | 3 | |
| Total | | 26 | | | 26 | | | 38 |

Third Class (Total No. of Units: 42)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|--|--------------|----|---|-------------|----|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE321 | Ceramic Materials Technology | 3 | 2 | 1 | 3 | 2 | 1 | 8 |
| MaE322 | Building Materials | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE311 | Inspection and Characterization of Engineering Materials | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE314 | Heat Treatments and Phase Transformations | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE317 | Engineering and Numerical Analyses | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE31 | Nanotechnology | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE323 | Ceramic and Glass | 2 | - | 1 | 2 | - | 1 | 4 |
| MaE324 | Electronic and Magnetic Materials | 2 | - | - | 2 | - | - | 4 |
| No. of Weekly hours | | 17 | 10 | 3 | 17 | 10 | 3 | |
| Total | | 30 | | | 30 | | | 42 |

Fourth Class (Total No. of Units: 35)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|---------------------------------|--------------|---|---|-------------|---|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE411 | Materials Engineering Design | 3 | - | 1 | 3 | - | 1 | 6 |
| MaE421 | Refractories | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE422 | Composite Materials Engineering | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE414 | Surface Engineering | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE416 | Graduation Project | 1 | 3 | - | 1 | 3 | - | 5 |
| MaE423 | Advanced Ceramic Materials | 2 | - | - | 2 | - | - | 4 |
| MaE417 | Selection Engineering Materials | 2 | - | 1 | 2 | - | 1 | 4 |
| No. of Weekly hours | | 14 | 7 | 4 | 14 | 7 | 4 | |
| Total | | 25 | | | 25 | | | 35 |

Polymeric Materials and Petrochemical Engineering Program Curriculum .\

First Class – 1st Course .\

| Code | Subject | Weekly hours | | | Units |
|---------------------|--|--------------|----|---|-------|
| | | First Course | | | |
| | | *Th | P | T | |
| MaEG111 | Principles of engineering metallic materials | 3 | 1 | 0 | 3.5 |
| MaEG112 | Principles of computer science | 2 | 2 | 0 | 3 |
| MaEG113 | Engineering and mechanical drawing I | 0 | 6 | 0 | 3 |
| MaEG114 | Workshops | 0 | 4 | 0 | 2 |
| MaEG115 | Mathematics I | 2 | 0 | 1 | 2 |
| MaEG116 | Engineering mechanic / Static | 2 | 0 | 1 | 2 |
| MaEG117 | Technical English language I | 2 | 0 | 0 | 2 |
| MaEG118 | Human rights | 1 | 0 | 0 | 1 |
| No. of Weekly hours | | 12 | 13 | 2 | |
| Total | | 27 | | | 18.5 |

First Class – 2nd Course

| Code | Subject | Weekly hours | | | Units |
|---------------------|--|--------------|----|---|-------|
| | | First Course | | | |
| | | *Th | P | T | |
| MaEG111 | Principles of engineering metallic materials | 3 | 1 | 0 | 3.5 |
| MaEG112 | Principles of computer science | 2 | 2 | 0 | 3 |
| MaEG113 | Engineering and mechanical drawing I | 0 | 6 | 0 | 3 |
| MaEG114 | Workshops | 0 | 4 | 0 | 2 |
| MaEG115 | Mathematics I | 2 | 0 | 1 | 2 |
| MaEG116 | Engineering mechanic / Static | 2 | 0 | 1 | 2 |
| MaEG117 | Technical English language I | 2 | 0 | 0 | 2 |
| MaEG118 | Human rights | 1 | 0 | 0 | 1 |
| No. of Weekly hours | | 12 | 13 | 2 | |
| Total | | 27 | | | 18.5 |

Where: MaE = Materials Engineering, Th = Theoretical Hours, P= Practical (laboratory) Hours and T = Tutorial Hours

Second Class (Total No. of Units: 38)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|---------------------------|--------------|---|---|-------------|---|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE211 | Engineering Metallurgy | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE212 | Mathematics II. | 3 | - | 1 | 3 | - | 1 | 6 |
| MaE213 | Programming. | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE214 | Manufacturing processes I | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE215 | Strength of Materials. | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE216 | Heat Transfer and Fluids. | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE217 | Chemical Metallurgy. | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| No. of Weekly hours | | 15 | 8 | 3 | 15 | 8 | 3 | |
| Total | | 26 | | | 26 | | | 38 |

Third Class (Total No. of Units: 43)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|---|--------------|---|---|-------------|---|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE331 | Engineering Polymers. | 3 | 2 | - | 3 | 2 | - | 8 |
| MaE311 | Inspection and Characterization of Engineering Materials. | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE332 | Polymer Fibers Technology | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE333 | Petro-Chemistry. | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE334 | Rubber Technology | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE317 | Engineering And Numerical Analyses | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE31 | Nanotechnology | 2 | 1 | - | 2 | 1 | - | 5 |
| MaE335 | Medical and Bio- polymers | 2 | - | - | 2 | - | - | 4 |
| No. of Weekly hours | | 17 | 9 | 1 | 17 | 9 | 1 | |
| Total | | 27 | | | 27 | | | 43 |

Fourth Class (Total No. of Units: 34)

| Code | Subject | Weekly hours | | | | | | Units |
|---------------------|--------------------------------|--------------|---|---|-------------|---|---|-------|
| | | First Term | | | Second Term | | | |
| | | *Th | P | T | Th | P | T | |
| MaE411 | Materials Engineering Design | 3 | - | 1 | 3 | - | 1 | 6 |
| MaE431 | Polymer Technology | 2 | 2 | - | 2 | 2 | - | 6 |
| MaE432 | Composite Material Engineering | 2 | 1 | 1 | 2 | 1 | 1 | 5 |
| MaE416 | Graduation Project | 1 | 3 | - | 1 | 3 | - | 5 |
| MaE433 | Synthetic Polymers | 2 | - | - | 2 | - | - | 4 |
| MaE434 | Petroleum Materials | 2 | - | - | 2 | - | - | 4 |
| MaE417 | Selection Engineering Material | 2 | - | 1 | 2 | - | 1 | 4 |
| No. of Weekly hours | | 14 | 6 | 3 | 14 | 6 | 3 | |
| Total | | 23 | | | 23 | | | 34 |

