**Self-Assessment Report**

***Materials Engineering Department***

***College of Engineering,***

***University of Basra,***

***Basra, Iraq***

**2020-2021**

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**Chapter 0: Background**

The materials engineering department was established in 1999-2000 to meet the emerging needs of the governmental and private sector agencies and companies for skilled materials engineers and to keep abreast of the scientific and technical progress in the world.

Since its inauguration, ME department adopted a well- established academic program equal to the materials engineering departments worldwide by focusing on both theoretical and practical integrated aspects of the materials engineering field of study.

The undergraduate study at the department is four years in length; from the moment of receiving the fresh first year students whose average grades qualify them to join up until the graduation of the senior final year students where they get their Bachelor of Science degree in the materials engineering.

In 2006-2007, the department has established a postgraduate studies course where the admitted graduates have to complete two years of study to get their Master of Science degree in materials engineering.

The material engineering departments constitutes of:

1. The **Head** of the department who manages the department's administrative and academic affairs, the **Head's** administrativesupportingstaff includes (secretary, assistants, and clerical members of the staff).
2. The **department panel** includes all the faculty members of the department whose names are listed in **Table0.1**.

**Table0.1: ME Department Faculty Members**

|  |  |  |
| --- | --- | --- |
| **No.** | **Rank** | **Full Name** |
| 1 | Professor | Dr. Adnan Shamkhy Jabur |
| 2 | Professor | Dr. Hayder A.H. Abood |
| 3 | Assist. Professor | Dr. Safaa A. S. Almtori |
| 4 | Assist. Professor | Dr. Qais A.Rishaq |
| 5 | Assist. Professor | Haider Maath Mohammed |
| 6 | Assist. Professor | Dr. Nuha Hadi Jasem |
| 7 | Lecturer | Dr. Atheed Habeeb Taha |
| 8 | Lecturer | Dr. Dhia Chaseb Ali |
| 9 | Lecturer | Dr. Khulood Ibraheem Dawood |
| 10 | Lecturer | Dr. Emad Obaid Bajee |
| 11 | Lecturer | Dr. Haider Kasem Meshri |
| 12 | Lecturer | Dr. Azzam Dawod Hassan |
| 13 | Lecturer | Dr. Safaa' Khaire Jaaz - |
| 14 | Lecturer | Dr. Atef Namah Jrad |
| 15 | Lecturer | Dr. Esraa Habeeb Kadhem |
| 16 | Lecturer | Dr. Asa'ad Abdul Sayed |
| 17 | Lecturer | Mr. Mohammad Mustafa |
| 18 | Assist. Lecturer | Mrs. Sundus Khaleel Alfaiz |
| 19 |  |  |
| 20 |  |  |

1. The department also has engineers, technicians, and administrators employees with their names mentioned in **Table 0.2**. Moreover, a number of visiting members of staff join the department from the outside industry on an annual basis.

**Table0.2: Engineers, Technicians, and administrators in M.E department**

|  |  |  |
| --- | --- | --- |
|  | **Name** | **Position, Specialty and Place of Work** |
| 1 | Mrs. Zainab Salem | BSc. Material Engineering |
| 2 | Mrs. Muneera Wahed Mohan | BSc. Physics/ Laboratory Assistant |
| 4 | Mrs. Resha Saad Yousif | BSc. Physics/ Laboratory Assistant |
| 5 | Mr. Muneer Yousef Khtheer | Diploma/ Laboratory Technician |
| 6 | Mr. Aqeel Abdul Hassan IShnaishel | Diploma/ Laboratory Technician |
| 7 | Mrs. Wela'a Abdulameer Abdul Sayed | Primary School Graduate / Secretary |
| 8 | Mrs. Saadya Atwan Hashem | Services Assistant |
| 9 | Mr. Ali Hussen Thwayed | Diploma/ Engineering Workshop |
| 11 | Mr. Abdulkarem Taleb Salman | Industrial School/ Engineering Workshop |
| 12 | Mr. Hamed Kasem Ali | Industrial School/ Engineering Workshop |
| 13 |  |  |

1. The department also has several committees, see **Table0.3**.

**Table0.3: Departmental Committees**

|  |  |
| --- | --- |
| **Committee Name** | **Responsibilities** |
| Scientific and Graduate Affairs Committee | * Make decisions and statements. * Issue graduation transcripts. * Develop the curricula. |
| Examination Committee | * Manage the examination process in each semester as well as the final exams. * Document the students' records, marks, and grades. |
| Imports Committee | * Determine what the department needs at the beginning of each academic year. |
| Inventory Committee | * Count and calculate prices of everything in the department and where everything has been moved to/from. |
| Gratis Books Committee | * Giving the students as well as faculty members the needed textbooks at the beginning of each academic year. |
| Summer Industrial Training Committee | * Assigning students to their designated summer training governmental companies. |
| Laboratories Maintenance Committee | * Maintain the healthy environment of laboratories. |
| Quality Assurance Committee | * Responsible for preparing reports, communicating the quality assurance requirements to the department. |
| Local Shopping Committee |  |

In this way, the overall department structure is shown in **Fig.0.1**:

**Fig.0.1: Department Structure**

Head of Department

Employees

Deputy Head

Faculty Members

Technicians

Administrators

Secretary

Service

Engineering Workshops

Metals Laboratory

Nonmetal Laboratory

Chemical Metallurgy Laboratory

Heat Treatment Laboratory

Computers Laboratory

Carrying out a SWOT analysis for this section, gives:

|  |  |  |
| --- | --- | --- |
|  | Helpful  (to achieving the objective) | Harmful  (to achieving the objective) |
| Internal origin  (attributes of  the department) | **Strengths**   * 22.22 % of the faculty members are of the academic title assistant professor. * 38.89 % of the faculty members are lecturers and 66.66% of the faculty members PhD Students wear completed their studies that is lead to increase the members whom have doctor degree 38.89% in the last assessment to 66.67% in the current assessment while the members hold the academic title of lectures increased from 27.78% to 50% in this assessment . * 16.67 % of the faculty members are currently completing their PhD studies. * this department includes diversification specialty can help in delivery into various kinds of science | Weaknesses   * No one of the faculty members holds the   academic title of a professor.   * There are no visits by faculty members to the industrial displays. * It should be to promote the university relation with universal universities hence the teaching staff can use this relation in developing their scientific, practical and research capabilities through training courses. * There is no induction chances offered to the new staff on the department and there are no training courses in the current time available to them and it's suggested to activate this in future by entering them in training programs inside or outside the country. * The department members did not include  engineering technicians to assist the lectures in the laboratories and drawings. * Lack of the expert technicians whom supervise the working of the instruments and machines also training the student to used them in order to guarantee long life of the laboratory instruments |
| External origin  (attributes of  the environment) | **Opportunities**   * 5.6 % of the faculty members have the intention to pursue their PhD degrees. * Recently a member from industrial (Iron and steel workers) has joining the staff of the material engineering department as a research postgraduate student, this will greatly help into developing the student industrial experts. | **Threats**   * The inability to appoint new faculty members due to the rules and regulations of the Ministry of the Higher Education and Scientific Research. * The department has one assistant lecturer who holds a master degree, has the intention to pursue his PhD degree. But he couldn't be added to the faculty members to fill the space of the assistant lecturer. * 11% of the faculty members retired on pension. |

**Chapter1: Criterion1 (Students)**

**1.1 Admission Process and Enrollment**

The new students are admitted to the college of engineering according to a central admission process called (grades comparison) organised annually by the Iraqi Ministry of Higher Education and Scientific Research / Undergraduate Studies, Planning, and Prosecution Office / Central Admission Department. The accepted students come from:

1. The High school graduates (scientific disciplines only).
2. The Technical Institutions graduates (The top 10 % of the graduates only).
3. The Industrial Technical Secondary schools (The top 5% of the graduates)
4. The Distinguished employees in the governmental establishments, who are originally technical institutions graduates

After the names of the accepted students are announced, the registration committee that consists of at least ten members including the dean's assistant for students' affairs has only ten days to meet the accepted students and complete their enrollment at the college. They are, then distributed again according to their high school marks on the eight departments in the college according to the student's choice (petroleum engineering, architecture engineering, computer engineering, civil engineering, electrical engineering, chemical engineering, mechanical engineering, and materials engineering).

For the Materials engineering department, the average marks of the newly enrolled students have changed through the past five years among the students as seen in **Table1.1 below**.

**Table 1.1: Records of Admissions Standards Applied over the Past 5 Years**

|  |  |  |
| --- | --- | --- |
| **Academic Year** | **Average Percentage of the Students (% MIN)** | **Number of Newly Enrolled Students** |
| **2020-2021** | 86.66 | 103 |
| **2019-2020** | 88.17 | 122 |
| **2018-2019** | 86.120 | 122 |
| **2017-2018** | 87.85 | 85 |
| **2016-2017** | 89 | 72 |
| **2015-2016** | 88.4 | 85 |

**1.2 Evaluating Students' Performance**

The engineering college students are evaluated using the following means:

1. Daily, monthly, semester, and final exams
2. Their laboratories reports
3. Individual Assignments
4. Final year project
5. Summer industrial training reports

**1.3 Advisory and Guidance**

During the past years, the ME department as well as the other college departments, has established an educational advisory scheme where one advisor or a tutor is assigned to give advice to one level of study (1st, 2nd, 3rd, and 4th) years.

Starting from this year (2016-2017), the department and the college has the intention to apply a new scheme of advisory with the following steps in mind:

1. The Head of the department allocates a number of the selected faculty members on the various stages in the department as (advisors) for each stage. Such an advisor is assigned a number of students from the same stage that the faculty member teaches. Each month the advisor meets her/his assigned students according to a pre-scheduled appointments.
2. Each advisor presents her/his monthly report to the Head who arranges the advisors reports and gives recommendations of solving any problems that may face both the advisors and the students.
3. These appointments can be classified as:
   1. Evaluation meetings: assess the student's readiness and abilities and accordingly determine the best advisory approach to follow.
   2. Diagnostic meetings: these meetings are used to answer questions and reach accurate diagnosis in order to lay out the advisory work plan of the department.
   3. Guidance/ Treatment meetings: where the treatment is applied according to the plan set in the previous meetings. This treatment depends on the skills and abilities of the advisors.

**1.4 Graduation Requirements**

In the ME department, each student has to complete **148** credit hours in order to obtain a Bachelor of Science (B. Sc.) degree; these credit hours are divided across four years of study as:

For the 1st year, **this has a weighting factor of [10 % x 1st year Aggregate]:**

**1.** 22/40 credits (55 %) as Materials Engineering requirements

**2.** 10/40 credits (25 %) as College requirements

**3.** 8/40 credits (20 %) as University requirements

For the 2nd year, **this has a weighting factor of [20 % x 2nd year Aggregate]:**

**1.** 30/38 credits (78.94%) as Materials engineering courses requirements

**2.** 4/38 credits (10.52%) as College courses requirements

**3.** 4/38 credits (10.52%) as University courses requirements.

For the 3rd year, **this has a weighting factor of [30 % x 3rd year Aggregate]:**

**1.** 30/36 credits (83.33%) as Materials Engineering requirements

**2.** 6/36 credits (16.67%) as College requirements

**3.** 0/36 credits (0%) as University requirements

For the 4th year, **this has a weighting factor of [40 % x 4th year Aggregate]:**

**1.** 30/34 credits (88.23%) as Materials Engineering requirements

**2.** 4/34 credits (11.76%) as College requirements

**3.** 0/34 credits (0%) as University requirements

**Overall Credit Percentage over the four years:**

**1. 112/148 credits (75.67 %) as Materials engineering requirements**

**2. 24/148 credits (16.21 %) as College requirements**

**3. 12/148 credits (08.10 %) as University courses requirements.**

**Table1.2** shows the records, over the past five academic years, of the total number of full time students enrolled in the program and the corresponding number of graduates for each year.

**Table 1.2: Total enrolled students and number of graduates each year for the past five years**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **The Year** | **2015-2016** | **2016-2017** | **2017-2018** | **2018-2019** | **2019-2020** | **2020-2021** |
| **Full-time students** | 198 | 198 | 202 | 238 | 271 | 267 |
| **No. of Graduates** | 54 | 52 | 43 | 24 | 36 | 44 |
| **No. of New students** | 39 | 72 | 85 | 122 | 122 | 59 |

**1.5 Transfer of Students**

Each year, the Iraqi Ministry of Higher Education and Scientific Research issues regulations of transferring successful students from/to all colleges and universities in Iraq. It also issues the instructions regarding the nominations and modifications for the deferred and unsuccessful students. The college of engineering carries out the Ministry instructions using the special forms distributed by the Ministry plus all the other required documents. The Students Affairs Department at the University of Basra maintains the transferring process and follows it up properly until the summer holidays, i.e., July – August.

Each transferred student undergoes what is called a scientific re-appraisal process executed by the scientific committee in the respective department if the curriculum and credit hours of the two colleges are incompatible in more than 80% of the credit hours. **Table1.2** shows the numbers of the transferred students from/to the department over the past five years.

**Table1.2: The number of students transferred from/to the department over the last five years**

|  |  |  |
| --- | --- | --- |
| **Academic Year** | **Number of Transferred Students** | |
| **From the department** | **To the department** |
| 2020-2021 | 1 | 21 |
| 2019-2020 | 14 | 2 |
| 2018-2019 | 9 | 2 |
| 2017-2018 | 2 | 6 |
| 2016-2017 | 2 | 8 |
| 2015-2016 | 0 | 1 |

The SWOT analysis for this criterion is shown below:

|  |  |  |
| --- | --- | --- |
|  | Helpful  (to achieving the objective) | Harmful  (to achieving the objective) |
| Internal origin  (attributes of  the department) | | **Strengths**   * According the valid rules of central admission, the department receives only those high-grade students each year. * Many aspects are used in evaluating the students. * Number of full-time students has been increasing steadily over the past five years from 211 to 231. * The minimum average percentage of the students was increased gradually through five years ago. | **Weaknesses**   * The number of the graduates has been nearly constant over the past five years from 26 to 38 in each year. * According the rules of the college, the department receives the students which have the lowest grades comparing with the other departments. * According the valid rules of central admission, the new students delayed on the lectures while the students in the other stages started with lectures |
| External origin  (attributes of  the environment) | | **Opportunities**   * The recently admitted new students' aggregates are higher than those admitted five years ago. * The newly adopted advisory and guidance method will help the department in assessing the students' performance. * Now, the newly admitted students' have better chances of learning due to the Improvement in and availability of the experimental works and improved laboratories. * Benefit from the expertise industrialists in the development of industrial experience students. | **Threats**   * The summer training reports provided by the various companies do not give a good feedback including what students have achieved; whether they were active or not; what their flaws and their strengths are, etc... * The Training course is very short to grant the student sufficient experience in his field of specialty. |

**Chapter2: Criterion2 (Program Educational Objectives)**

**2.1 Vision of the Department**

The ME Department is ranked as one of the top of the ME departments in Iraq with respect to the teaching, scientific research, and community services provided.

**2.2 Mission of the Department**

Within the context of the college of engineering goals and to keep abreast of the materials engineering field progress, the ME department aims to meet the emerging needs for specialized materials engineers. These engineers will be capable of carrying researches in sciences related to materials in a way that enables the government and private sector agencies to solve the problems they face efficiently.

**2.3 Strategic Objectives of the Department**

The Program Educational Objectives (**PEOs**) clearly reflect the professional expectations from the graduates of the materials engineering department and prepare them to meet those challenges. **Table2.1** shows the ME department PEOs.

**Table2.1: Program Education Objectives**

|  |  |
| --- | --- |
| **PEO1** | Graduates will be engaged in materials engineering related careers that could serve the needs of both of the industry and academia, in the private and public sectors, as well. The objective is to apply the essential elements of ME competently, which are defined by the inter-relationships among composition, structure, properties, processing and performance of the engineering materials. |
| **PEO2** | Graduates must know devise, design and conduct experimental, analytical and computational exercises necessary to further explore the essential elements of materials and engineering .the pursuit of knowledge and active, continuous and lifelong professional development through the continuous reading of up to date scientific researches, the engagement in the further/continual education courses, and admission to graduate studies. |
| **PEO3** | Graduates will contribute to help solve the complex engineering problems by applying the related principles of the engineering materials disciplines and by functioning effectively within the multidisciplinary teams. The welfare of society is to be consistent with the development of its professional standards through the responsible practice of the engineering disciplines. |

**2.4 Consistency of the PEOs with the College Educational Objectives (CEOs)**

The PEOs of the materials engineering department are coherent and in line with those objectives of the college of engineering. They are stated in accordance with the College Educational Objectives (**CEOs**); mentioned in **Table2.2**, while preserving the unique characteristics of the department of computer engineering.

**Table2.2: College Education Objectives**

|  |  |
| --- | --- |
| **CEO1** | Prepare globally competent and socially responsible graduates who are specialists in engineering sciences and their applications by providing quality education. |
| **CEO2** | Encourage and support higher degree graduate studies (master and doctorate) in all college departments. |
| **CEO3** | Foster research and scholarly endeavors that advance knowledge and help in solving the industrial and social problems. |
| **CEO4** | Contribute to the welfare of the country by establishing effective partnerships that can add value and contribute to college programs. |
| **CEO5** | Create an enriching supportive working environment for the college community to ensure the achievements of the college objectives. |

**Table2.3** establishes the links between the PEOs of the department and the major components of the CEOs of the college of engineering.

**Table2.3: Links between the PEOs of the Department and the CEOs of the College**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | **Program Educational Objectives (PEOs)** | | |
| **PEO1** | **PEO2** | **PEO3** |
| **College of Engineering**  **Objectives**  **(CEOs)** | **CEO1** | **X** | **X** | **X** |
| **CEO2** |  | **X** |  |
| **CEO3** | **X** | **X** | **X** |
| **CEO4** | **X** | **X** | **X** |
| **CEO5** | **X** | **X** |  |

**2.5 Program Outcomes**

The main objective of the program outcomes, POs, and the program Educational Objectives, PEOs, is to measure the level of achievement of the curriculum requirement of the department in preparing the graduates to meet the challenges presented to them by the fascinating computer industry. In other words, the computer engineering Program outcomes, POs, and Program Educational Objectives, PEOs, are two different, but interrelated mechanisms that were developed in order to measure the level of achievement and success of the program.

The COE department has developed ten Program Outcomes (POs) as an initial set of POs. These outcomes are, in effect, what the students expected to know and achieve post graduation.

**Table2.4** shows these program outcomes.

**Table2.4: Materials Engineering Program Outcomes**

|  |  |
| --- | --- |
| **Symbol** | **Description** |
| **A** | **PO1:** ability to apply knowledge of mathematics, science, and engineering fundamentals |
| **B** | **PO2:** ability to design and conduct experiments as well as analyze and interpret data |
| **C** | **PO3:** ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. |
| **D** | **PO4:** ability to function on multi-disciplinary teams |
| **E** | **PO5:** ability to identify, evaluate and solve engineering problems |
| **F** | **PO6:** understanding of professional and ethical responsibilities |
| **G** | **PO7:** ability to communicate effectively |
| **H** | **PO8:** ability to understand the impact of engineering solutions in a global, economic, environmental, and societal context |
| **I** | **PO9:** recognition of the need for, and an ability to engage in life-long learning |
| **J** | **PO10:** knowledge of contemporary issues related to engineering. |
| **K** | **PO11:** ability to use the techniques, skills, and modern engineering tools necessary for the engineering practice. |

**2.6 Relationship of the Program Outcomes to the PEOs**

Mapping between the Program Outcomes and the Program Educational Objectives is shown in **Table2.5**.

**Table2.5: Mapping of Program Outcomes to PEOs**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PEOs** | | |
| **POs** | **PEO1** | **PEO2** | **PEO3** |
| **PO-a** | **X** |  |  |
| **PO-b** |  | **x** |  |
| **PO-c** |  | **X** | **X** |
| **PO-d** |  |  |  |
| **PO-e** | **X** | **X** |  |
| **PO-f** |  |  |  |
| **PO-g** |  |  | **x** |
| **PO-h** |  |  | **X** |
| **PO-i** |  | **X** |  |
| **PO-j** |  |  |  |
| **PO-k** | **X** | **X** | **X** |

The SWOT analysis gives us:

|  |  |  |
| --- | --- | --- |
|  | Helpful  (to achieving the objective) | Harmful  (to achieving the objective) |
| Internal origin  (attributes of  the department) | **Strengths**   * The department vision, mission, and objectives focus on the graduates and the overall knowledge they get to apply in their future carrier. * Prepare the students to be researcher and leader of group by give them new topic and work as a group to prepare the paper and power point slide and present it in form of the students in the class as a part of new technique for teaching. | Weaknesses   * PEO2 fulfills CEO2; they both focus on the graduate studies, but unfortunately, the department has had its postgraduate studies program canceled, this year, according to the Ministry orders. * Absent of internet room for the student to search about the new references and to carry out their researches. * Interlock with the local industry to carry out the research and help them to solve problems. * Engineering workshops too old to catch up with modern technology, it must be provided them with modern machines. * No scientific conferences for research students in the third and fourth stages |
| External origin  (attributes of  the environment) | **Opportunities**   * By continuously upgrading the PEO and PO, all the present threats would vanish. * By reopening the postgraduate studies at the department, the weaknesses will be eliminated. | **Threats**   * The program outcomes (a-k) do not fully accomplish the PEO3, which focuses on the contributions of the graduates to the welfare of the society. |

**Chapter3: Criterion3 (Curriculum)**

**3.1 Curricula/Course Description**

In the materials engineering department, a digit describes each curriculum as follows:

1. Curriculum/ Course Number and Title: each course is coded as:

******Course Number = MEA+ X X X (3 Digits Number)**

For example, **COE432 Software Engineering** means that this is a computer engineering department course that is taken by the **fourth year** students; it is the **second course** within the **department curriculum** **requirement**.

1. Required or elective: whether it is a required course for the program or an elective one.
2. Course description: defines what the course is designed for and why it is given to the students.
3. Recommended Textbook(s): the recommended textbook(s) or the internet articles to teach this course
4. Prerequisites (if any): these have been established to assure an adequate and uniform background for students in advanced classes.
5. Course Topics: detailed syllabus of the course
6. Course Outcomes: the key points that the students have learned

**3.2 Graduation Requirements**

To graduate, each student has to complete **157**credit hours during his/her four years of study. **Fig.3.1** and **Table 3.1** show the ME curriculum requirements over the four years of study.

**Fig.3.1: Roadmap to Graduation**

|  |  |  |  |
| --- | --- | --- | --- |
| Year 2/ 2nd Course | Year 2/ 1st Course | Year 1/ 2nd Course | Year 1/ 1st Course |
| Applied Mathematics II \*\* | Applied Mathematics I \*\* | Engineering Mechanics/ dynamics | Engineering Mechanics/ static |
| Computer Programming | Introduction to Computer Programming | Mathematics II \*\* | Mathematics I \*\* |
| Mechanical Drawing II | Mechanical Drawing I | Materials Extraction Methods | Materials Extraction Technology |
| Chemical Metallurgy | Metallurgical Thermodynamics | Applied Sciences | Principle of Engineering Materials |
| Engineering Metallurgy | Physical Metallurgy | Electrical Engineering | Principle of Electrical Engineering |
| Strength of Materials | Mechanics of Materials | Engineering Drawing II\*\* | Engineering Drawing I\*\* |
| Fluid Mechanics | Fundamental of Thermodynamics | Computer Science\* | Principles of Computer Science\* |
| Laboratories II | Laboratories I | Engineering Workshop II | Engineering Workshop I |
|  | Democracy & Freedom Concepts \* | Technical English \* | English \* |

|  |
| --- |
| University Requirements \* |
| College Requirements \*\* |
| Department Requirements |

|  |  |  |  |
| --- | --- | --- | --- |
| Year 4/ 2nd Course | Year 4/ 1st Course | Year 3/ 2nd Course | Year 3/ 1st Course |
| Selection of Engineering Materials and Design | Mechanical Design | Numerical Analysis \*\* | Engineering Analysis \*\* |
| Stresses Analysis and Plasticity | CAD/CAM | Failure of Engineering Materials | Behavior of Engineering Materials |
| X-Ray Diffraction and Microscopy | Non-Desctructive Testings | Heat Treatments of Non-Ferrous Metals | Heat Treatments of Ferrous Metals |
| Nano-Materials | Composite Materials | Welding and cutting | Technology of Engineering Materials 1 |
| Advanced Materials | Powder Metallurgy | Corrosion II | Corrosion I |
| Project Managements | Industrial Engineering | Ceramic Materials | Polymers Materials |
|  |  | Convection Heat Transfer | Conduction Heat Transfer |
| Engineering Project \*\* | Engineering Project \*\* | Laboratories II | Laboratories I |
|  |  |  | Summer Training |

|  |
| --- |
| University Requirements \* |
| College Requirements \*\* |
| Department Requirements |

**Table3.1: ME Curriculum Requirements**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Total ME Requirements: 148 credit hours / 33 courses** | | | | | | | | |
| **Requirements** | | | **Credit Hours** | | | | | |
| University Requirements | | | 10 | | | | | |
| College Requirements | | | 26 | | | | | |
| Department Requirements | | | 112 | | | | | |
| **Total** | | | **148** | | | | | |
| **University Requirements: 10 credit hours / 5 courses** | | | | | | | | |
| **Course No.** | | **Course Title** | | **Credit Hours** | | **Weekly Hours** | | |
| **U116** | | Principles of Computer Science | | **3** | | **4** | | |
| **U126** | | Computer Science | | **3** | | **4** | | |
| **U119** | | English | | **1** | | **2** | | |
| **U129** | | English / Technical | | **1** | | **2** | | |
| **U218** | | Human Rights and Democracy Concepts | | **2** | | **2** | | |
|  | | **Total** | | **10** | | **14** | | |
| **College Requirements: 26 credit Hours / 11 courses** | | | | | | | | |
| **Course No.** | **Course Title** | | | **Credit Hours** | | **Weekly Hours** | | |
| **Theory** | **Tut.** | **Lab.** |
| **E111** | Mathematics I | | | **3** | | **3** | **1** |  |
| **E121** | Mathematics II | | | **3** | | **3** | **1** |  |
| **E114** | Engineering Drawing I | | | **2** | | **1** | **2** |  |
| **E124** | Engineering Drawing II | | | **2** | | **1** | **2** |  |
| **E127** | Applied Sciences | | | **2** | | **2** |  |  |
| **E211** | Applied Mathematics I | | | **2** | | **2** | **2** |  |
| **E221** | Applied Mathematics II | | | **2** | | **2** | **2** |  |
| **E311** | Engineering Analysis | | | **3** | | **2** | **2** |  |
| **E321** | Numerical Analysis | | | **3** | | **2** | **2** | **2** |
| **E407** | Engineering Project I | | | **2** | | **1** | **-** | **2** |
| **E407** | Engineering Project II | | | **2** | | **1** |  | **2** |
|  | **Total** | | | **26** | | **20** | **14** | **6** |
| **Department Requirements: 112 credit hours / 51 courses** | | | | | | | | |
| **Course No.** | **Course Title** | | | | **Credit Hours** | **Weekly Hours** | | |
| **Theory** | **Tut.** | **Lab.** |
| **MAE112** | Engineering Mechanics / static | | | | **3** | **2** | **1** |  |
| **MAE122** | Engineering Mechanics / dynamic | | | | **3** | **2** | **1** |  |
| **MAE113** | Materials Extraction Technology | | | | **2** | **2** | **1** |  |
| **MAE123** | Materials Extraction Methods | | | | **2** | **2** | **1** |  |
| **MAE115** | Principles of Electrical Engineering | | | | **3** | **2** | **1** | **2** |
| **MAE125** | Electrical Engineering | | | | **3** | **2** | **1** | **2** |
| **ME133** | Principles of Engineering Materials | | | | **2** | **2** |  |  |
| **MAE118** | Engineering Workshops (I) | | | | **1** |  |  | **2** |
| **MAE128** | Engineering Workshops (II) | | | | **1** |  |  | **2** |
| **MAE212** | Metallurgical Thermodynamics | | | | **2** | **2** |  |  |
| **MAE222** | Chemical Metallurgy | | | | **2** | **2** |  |  |
| **MAE213** | Physical Metallurgy | | | | **2** | **2** |  |  |
| **MAE223** | Engineering Metallurgy | | | | **2** | **2** |  |  |
| **MAE214** | Mechanics of Materials | | | | **3** | **2** | **1** |  |
| **MAE224** | Strength of Materials | | | | **3** | **2** | **1** |  |
| **MAE215** | Thermodynamics | | | | **2** | **2** |  |  |
| **MAE225** | Fluid Mechanics | | | | **2** | **2** |  |  |
| **MAE216** | Introduction to Computer Programming | | | | **3** | **2** |  | **2** |
| **MAE226** | Computer Programming | | | | **3** | **2** |  | **2** |
| **MAE217** | Mechanical Drawing (I) | | | | **2** | **1** |  | **2** |
| **MAE227** | Mechanical Drawing II | | | | **2** | **1** |  | **2** |
| **MAE219** | Laboratory 2(I) | | | | **2** |  |  | **3** |
| **MAE228** | Laboratory 2(II) | | | | **2** |  |  | **3** |
| **MAE312** | Behavior of Engineering Materials | | | | **3** | **3** |  |  |
| **MAE322** | Failure of Engineering Materials | | | | **3** | **3** |  |  |
| **MAE313** | Heat Treatments of Ferrous metals | | | | **2** | **2** | **1** |  |
| **MAE323** | Heat Treatments of non-ferrous metals | | | | **2** | **2** | **1** |  |
| **MAE314** | Engineering Materials Technology | | | | **2** | **2** | **1** |  |
| **MAE324** | Welding and Cutting | | | | **2** | **2** | **1** |  |
| **MAE315** | Ceramic Materials | | | | **2** | **2** |  |  |
| **MAE325** | Polymers Engineering | | | | **2** | **2** |  |  |
| **MAE316** | Corrosion (I) | | | | **2** | **2** | **1** |  |
| **MAE326** | Corrosion (II) | | | | **2** | **2** | **1** |  |
| **MAE317** | Conduction Heat Transfer | | | | **2** | **2** | **1** |  |
| **MAE327** | Convection Heat Transfer | | | | **2** | **2** | **1** |  |
| **MAE318** | Laboratory 3(I) | | | | **2** |  |  | **3** |
| **MAE328** | Laboratory 3(II) | | | | **2** |  |  | **3** |
| **MAE411** | Mechanical Design | | | | **3** | **2** | **2** |  |
| **MAE421** | Selection of Engineering Materials for Design | | | | **2** | **2** | **1** |  |
| **MAE412** | Non-Destructive Testing | | | | **2** | **2** | **1** |  |
| **MAE422** | X-Ray Diffraction and Microscopy | | | | **2** | **2** | **1** |  |
| **MAE413** | Composite Materials | | | | **2** | **2** | **1** |  |
| **MAE423** | Advance Materials | | | | **2** | **2** | **1** |  |
| **MAE414** | Powder Metallurgy | | | | **2** | **2** | **1** |  |
| **MAE424** | Stress Analysis and Plasticity | | | | **2** | **2** | **1** |  |
| **MAE415** | CAD & CAM | | | | **2** | **2** |  |  |
| **MAE425** | Nano Materials | | | | **2** | **2** |  |  |
| **MAE416** | Industrial Engineering | | | | **2** | **2** | **1** |  |
| **MAE426** | Project Management | | | | **3** | **2** | **2** | **2** |
| **MAE418** | Laboratories 4 (I) | | | | **2** |  |  | **3** |
| **MAE428** | Laboratories 4(II) | | | | **2** |  |  | **3** |
| **Total** |  | | | | **112** | **86** | **28** | **36** |

**3.3 Mapping of Course Learning Outcomes to Program Outcomes**

An academic program is, in effect, the superposition of a set of courses, somehow, linked together to achieve a certain program outcome. This means that the courses in any academic program represent the building blocks of that program. An assessment of the program would only be possible if the course learning outcomes are mapped to the program outcomes. The course learning outcomes of individual program courses are listed in the detailed course syllabus, which are prepared by the faculty teaching staff for that particular course and submitted to the student at the beginning of the year. Each year, immediately after tallying the final grades of all courses, mapping between the courses and the program outcomes is also established. Mapping of all the courses offered by the ME department is given below in **Table3.2**.

**Table3.2: Mapping of the CoE Core Courses to the Program Outcomes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course No.** | **Course Title** | **Program Outcomes** | | | | | | | | | | |
| **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** |
| **First Year** | | | | | | | | | | | | |
| **U116** | Principles of Computer Science | X | X |  |  | X |  | X | X | X | X | X |
| **E111** | Mathematics I | X |  |  |  | X |  | X | X |  | x |  |
| **E127** | Applied Sciences |  | X |  |  | X | X |  |  |  |  | X |
| **E114** | Engineering drawing |  |  |  | X |  |  | X |  | X |  | X |
| **MAE112** | Engineering mechanics | X | X |  |  | X |  |  |  |  |  | X |
| **MAE113** | Methods of extracting engineering materials | X | X | X |  |  |  |  | X |  |  | X |
| **MAE117** | Fundamental of Materials production engineering | X | X | X |  | X |  | X | X | X |  | X |
| **MAE115** | Fundamental of electrical engineering | X | X | X |  | X |  |  | X |  |  | X |
| **Second Year** | | | | | | | | | | | | |
| **U218** | Democracy and freedom concepts |  |  |  |  |  | X |  | X |  |  |  |
| **E211** | Mathematics II | X |  |  |  | X |  | X | X | X | X |  |
| **MAE216** | Computers programming | X | X |  |  | X |  | X | X | X | X | X |
| **MAE217** | Mechanical drawing | X |  | X |  |  |  |  | X |  |  | X |
| **MAE212** | Chemical metallurgy | X |  |  |  | X |  |  | X |  |  | X |
| **MAE213** | Engineering metallurgy | X | X | X |  | X |  | X | X | X |  | X |
| **MAE214** | Mechanics of Materials | X | X | X |  | X |  |  | X |  |  | X |
| **MAE215** | Fundamentals of thermodynamic | X | X | X |  |  |  |  | X |  |  | X |
| **Third Year** | | | | | | | | | | | | |
| **MAE317** | Heat Transfer | X | X | X |  |  |  |  | X |  |  | X |
| **MAE315** | Ceramic Materials (MAE315) | X |  | X |  | X |  |  | X |  | X | X |
| **MAE312** | Behavior of engineering materials | X | X | X |  | X |  | X | X | X |  | X |
| **MAE314** | Technology of materials engineering 1 | X | X | X |  | X |  | X | X | X |  | X |
| **MAE316** | Corrosion (I) (MAE316) | X | X | X |  | X |  | X | X | X |  | X |
| **MAE313** | Heat Treatments of engineering materials | X | X | X |  |  |  |  | X |  |  | X |
| **MAE325** | Polymers Engineering | X | X | X |  | X |  | X | X | X |  | X |
| **E311** | Engineering and Numerical analysis | X |  |  |  | X |  | X | X | X | X | X |
| **Fourth Year** | | | | | | | | | | | | |
| E407 | Engineering Project | X | X | X | X | X | X | X | X | X | X | X |
| **MAE411** | Mechanical design | X | X | X |  | X |  |  | X |  | X | X |
| **MAE421** | Design and Selection of engineering materials | X | X | X |  | X |  |  | X |  | X | X |
| **Mae423** | Advanced Materials | X | X | X |  | X |  | X | X | X |  | X |
| **MAE424** | Stresses analysis and Plasticity | X | X |  |  | X |  |  | X |  | X | X |
| **MAE415** | CAD/CAM | X | X | X |  | X |  |  | X |  | X | X |
| **MAE422** | Testing of materials engineering | X | X | X |  | X |  | X | X | X |  | X |
| **MAE416** | Industrial engineering | X | X | X |  | X |  |  | X |  | X | X |

**3.4 Courses Syllabi**

**3.4.1 University Course Requirements**

ME211 Democracy and Freedom Concepts

***Designation as a required or elective course:***

This is a required course.

***Course Description:***

This course is designed to give the student the definition of freedom and democracy. It explains the history of democracy, democracy and freedom properties, and ancient democracy & its comparison to modern one.

***Recommended Textbook(s):***

By topics.

***Prerequisites:***

None.

***Course Topics:***

1. The concept of democracy.
2. The concept of freedom.
3. History of democracy and freedom.
4. The properties and principles of democracy and freedom.
5. The relationship between freedom and democracy.

***Course Outcome:***

1. Learn what democracy is.
2. Learn what freedom is and how it can be achieved.
3. Get a comprehensive view of democracy and freedom properties.
4. Learn how Iraq tries to achieve freedom through its democratic laws.

**3.4.2 College Course Requirements**

ME121 Mathematics I

***Designation as a required or elective course:***

This is a required course.

***Course Description:***

This course is designed to teach the students the mathematical functions types and their various differentiation methods, integration methods and rules, high level differentiation and integrals, the vectors in space and their various operations. It also teaches them the complex geometry, coordinates systems, and determinants & matrices operations.

***Recommended Textbook(s):***

1. Thomas, "Calculus and Analytic Geometry", 2002.

***Prerequisites:***

None.

***Course Topics:***

1. Review of functions (absolute value, greatest integer, signum, domain and range algebraic, trigonometric functions and their inverse).
2. Differentiation methods and their applications (limits and continuity, derivative rules, applications: (time rate, maxima and minima, concave, and curve plotting)).
3. Integration methods and their applications (finite integration, rules of integration, applications: area, volume, arc-length, special integrals, rotating and shifting of axes, and conical sections).
4. Vectors (vectors in the space and in the plane, vector and scalar products, triple products, and equations of line & plane in the space).
5. Complex geometry (complex numbers, modulus, argument, conjugate, addition and multiplication, (Cartesian, trigonometric, polar, and exponential forms), translation, rotation by angle).
6. Coordinates (polar coordinates: equivalent points and equations, Cartesian and polar relationship, and applications in areas) | (three dimensional coordinates: Cartesian, cylindrical, and spherical).
7. Determinants and matrices (determinants properties, system of linear equations, Gramer's rule, sum and product of matrices, matrix inverse, solution of linear equations using matrices).
8. Functions of two or more variables (partial differentiation, total differentiation, and multiple integrals).

***Course Outcome:***

1. Learn how to use the differentiation methods and their applications in calculating rate, maxima and minima, and curve plotting.
2. Learn how to use the integration methods and their applications in calculating area, volume, etc.
3. Have knowledge in vector, coordinates, and complex geometry.
4. Have knowledge in matrices and their usage in solving systems of linear equations.

M122 Chemist and Physics

***Designation as a required or elective course:***

This is a required course.

***Course Description:***

This course is designed to give the students an introduction to atomic structure and electronic state. It teaches them the properties of semiconductor materials: intrinsic and extrinsic,

***Recommended Textbook(s):***

***Prerequisites:***

None.

***Course Topics:***

***Course Outcome:***

ME221 Mathematics II

***Designation as a required or elective course:***

This is a required course.

***Course Description:***

This course is designed to teach the students methods of solving differential equations (first and high orders), vector analysis, partial differentiation, sequences and series, and Laplace transform.

***Recommended Textbook(s):***

1. Thomas, "Calculus and Analytic Geometry".
2. Kreyszig, "Advanced Engineering Mathematics".

***Prerequisites:***

None.

***Course Topics:***

1. Differential Equations: first order (variables separable- homogeneous- linear- exact, second order: linear equation with constant coefficients, linear homogeneous equations with constant coefficients, higher order linear equations with constant coefficient, D-operator, solutions using D-operator, Cauchy equation.
2. Vector Analysis: scalars and vectors, components of a vector, addition of vectors, multiplication by scalars, vector in space, dot product, cross product, forms of equation of a curve in space, parametric representation, tangential and normal vectors, curvature, radius of curvature, forms of equation of a surface in space, gradient and normal vectors, vector function in Cartesian cylindrical and spherical coordinates, speed, and acceleration, line, surface, and volume integrals, Grean 's theorem, Stock's theorem, and Divergence theorem.
3. Partial Differentiation: functions of two or more variables, tangent plane and normal line, the directional derivative, the gradient, the chain rule for partial derivatives, the total differential, maximum and minimum of two independent variables.
4. Sequences and series: Sequences and subsequences, limits, uniqueness of limits, series convergence and divergence, comparison test, comparison of ratios, integral test, test of alternating series, absolute and conditional convergence, infinite series test for convergence, power series for functions, Taylor's theorem, Mclaurian series, and convergence of power series, differentiation and integration, solution of differential equations by series, Legender and Bessel equations.
5. Laplace Transform: transforms and properties, inverse transform, partial fraction, application, DE solutions using Laplace transform.

***Course Outcome:***

1. Learn the different methods of solving differential equations (first and high orders).
2. Learn the properties and uses of vector analysis.
3. Learn the partial differentiation and its properties.
4. Learn different sequences and series rules and methods.
5. Learn the Laplace transform and its applications in solving DE equations.

ME321 Engineering and Numerical Analysis

***Designation as a required or elective course:***

This is a required course.

***Course Description:***

This course is designed to teach the students methods of engineering analysis (Laplace and Fourier), complex variables, probability theorem, numerical analysis (solution of linear and nonlinear equations, solution of differentiations and integrals).

***Recommended Textbook(s):***

1. Kreszig, "Advanced Engineering Mathematics".
2. Kadhum Al-lami, "Introductory Methods of Numerical Analysis".

***Prerequisites:***

None.

***Course Topics:***

1. Engineering Analysis:
   1. Laplace and Fourier analysis: Laplace transform and applications, Fourier series (Trigonometric, exponential, complex), odd and even symmetry, half-symmetry, Fourier transform, properties and applications.
   2. Complex Variables: complex integrals and differentiations.
   3. Fundamentals of Probability Theorem: definitions, probability density function, distribution functions (uniform, binomial, normal, etc), mean, variance, moments.
2. Numerical Analysis:
   1. Solution of System of Linear Equations: Gauss elimination, Gauss- Jordan method, Matrix inversion by Gauss-Jordan method, Gauss- Seidal iteration method.
   2. Solution of Non Linear Equations: Bisection method, False-Position method, Newton- Raphson method.
   3. Solution of Simultaneous non linear equations: Newton-Raphson method, the method of iteration.
3. Numerical Differentiation and integration: finite differentiation, numerical solutions of ordinary differential equations (Euler's method, Improved Euler's method, Modified Euler's method, Taylor's series method, Range Kutta method 2nd and 4th order.

***Course Outcomes:***

1. Learn how to use different transformations through engineering analysis.
2. Learn the probability theorem and its applications.
3. Learn how to solve linear and nonlinear equations through numerical analysis methods***.***
4. Learn how to use numerical analysis in solving differentiations and integrals.

The SWOT analysis gives:

|  |  |  |
| --- | --- | --- |
|  | Helpful  (to achieving the objective) | Harmful  (to achieving the objective) |
| Internal origin  (attributes of  the department) | **Strengths**   * The 157 total credit hours are equal to the number of credit hours at other ME departments in Iraq and worldwide. * The used textbooks are updated by the faculty member her/himself using the internet. Thus, no outdated textbooks are used. | **Weaknesses**   * There are no elective courses,. * The ministry rules do not allow changing all the curricula. * Low experimental courses |
| External origin  (attributes of  the environment) | **Opportunities**   * If each faculty member writes and updates her/his curriculum outcomes well, she/he will definitely help in improving the overall POs of the program. | **Threats**   * Each faculty member can only change 10% of the curriculum content. * The inability to include new curriculum since the Ministry rules do not allow such changes. |

**Chapter4: Criterion4 (Faculty)**

**4.1 Leadership Responsibilities**

The Head of the materials engineering department is the most pivotal of all positions concerned with the instructional development. The policies of the college and university delegate the prime responsibility of the department daily operation to the Head. The Head is thus, assigned the task of running and managing the department. As the executive officer, the Head is responsible to both the dean of the college of engineering and the department. It is the Head, who maintains daily contacts with the administration, with the faculty and with the students. It is in this last context where the Head has to ensure that the department's mission and educational objectives are met. This could be achieved through the following:

1. Departmental affairs: developing and accomplishing the departmental missions and objectives within those of the university; establishing departmental policies; conducting departmental meetings; involving faculty members and students in departmental decision-making and activities.
2. Academic affairs: establishing the departmental degree programs and curricula; evaluating, updating and improving the program curricula, and enforcing the quality of instruction.
3. Office management: administering departmental facilities; appointing, supervising, and evaluating staff personnel (secretaries, laboratory assistants and other workshop technicians); establishing file and record systems (faculty, students, courses, academic data, correspondence, etc…); maintaining equipment and other department properties; requisitioning supplies; ordering textbooks, etc…
4. Personal professional performance: providing professional leadership and setting an example in the department; demonstrating professional competence in teaching, research, and other professional activities; participating in professional associations and community service, setting academic standards; and preparing term schedules of the various courses.
5. Faculty affairs:

* Recruiting and orienting new faculty members; supporting and encouraging high performance in teaching, research, conference attendance, seminars, workshops, and other professional activities;
* Enforcing faculty responsibilities and protecting faculty rights; evaluating faculty members and making documented recommendations to the dean for each member.

1. Student affairs:

* Facilitating a constructive environment to consolidate the program covering both teaching and learning processes
* Curricula and career advisory for all students
* Responding to student grievances and complaints
* Certifying students for graduation

1. Program affairs:

* Organising regular meetings within the faculty to decide on further steps to improve the program
* Managing essential funds for the laboratory equipment, day-to-day functioning, and other departmental social activities
* Executing the COE Program, alteration, and improvement of the proposed program constituencies

1. External communications: conveying university policies and actions within the department, representing the department in the college, the university and all external agencies and communicating departmental programs and activities with respect to students
2. Budgetary affairs: preparing an annual departmental budget requests; administering budgetary allocations (preparing requisitions, authorizing expenditures, and maintaining budgetary records).

**4.2 Authority and Responsibility of the Faculty**

The faculty members are the backbone of the department and their role in the running of the department is very crucial. The department senate or faculty council makes decisions, recommendations, proposals and policy changes within the department. The approval of the majority of the council is essential prior to passing the decisions to the Head for further action. In effect, the department’s council role is not limited only to the academic matters but goes beyond those to include all aspects of governing the department. However, the responsibilities that could vary among individuals in the department, all members participate in the following activities:

1. Teaching: proposing new curriculum courses, modifying and updating existing courses; course evaluation through conducting exams, quizzes, assignments, projects, etc. In order to provide consistency in the department, faculty members in the Computer Engineering Department are recommended to:

* Keeping the relevant changes up to date, in their related fields, and carefully preparing lectures and course materials
* Keeping lectures accessible to students for academic consultation during scheduled or prearranged office hours.
* Informing students about the course formats, assignments, and methods of evaluation
* Maintaining teaching schedules in all but the exceptional circumstances
* Informing students of any necessary cancellations and rescheduling of instructions.
* Adhering to the pre-arranged schedules for submission of grades and evaluations of examination papers by the department teaching staff

1. Research: members of the staff devote a good portion of their time to carry out research or creative work, within the constraints of the relatively heavy teaching loads. All full time faculty members are encouraged to make the results of such activities available, to other researchers and academics, through publications, lectures, and other appropriate means.
2. Service to the university: some faculty members in the department are assigned different tasks at the university level. This is realized, among other duties, through; reviewing of academic publications, editorial board members, organizing International conferences, and other academic associations and consultancy assignments.

**4.3 Faculty**

The materials engineering department has 10 full-time, 5 part-time and 3 PhD students two of them studying outside Iraq as the faculty members, including the Head of the department. In terms of scientific title distribution, they are distributed as follows:

|  |
| --- |
| * 1 Professors * 4 Assistant Professors * 12 Lectures * 2 Assistant Lectures |

Among our faculty, the number of years of teaching experience ranges from 1to 20 years, with an average of 251/18= 13.94 years .The number of years of teaching experience, at the University of Basrah, only, ranges from 1 to 20 years, with an average of 287/18= 15.944 years. In the process of assessing the faculty activities in the ME department it was realized that, on average, the department is more inclined towards teaching rather than research and other scholarly activities. Detailed information regarding the credentials, experience, workload, and committees' involvement of the faculty members in the ME department is included in **Tables 4.1** and **4.2** below.

**Table4.1: Faculty Workload Summary for the Academic Year 2021-2022**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Faculty Member** | **FT or PT** | **Rank** | **Degree, Institution from which Degree Earned, Year** | **Prof. Society** | **Experience** | | | **Classes Taught through**  **2015-2016**  **(Credit Hours)** | **Total Activity Distribution** | | | |
| **Total Faculty** | **This Institution** | **Work & Other** | **Av. Load**  **Hs/Week** | **Teaching** | **Research** | **Others** |
| Adnan Shamki Jabur | **FT** | **Professor** | **Phd.**  **University of Technology** | **-** | **22** | **22** | **0** | **MAE326 // MAE315** |  |  |  | |
| Dhia'a CH. Ali |  | **Lecturer** | **Ph. D, Basrah University, Iraq, 2009** |  | **22** | **22** | **0** | **E111 // E121**  **E211 // E221** | **22** | **22.70%** | **Graduate Studies Load + Examination Committee Responsibilities** | |
| Mohammed M.Abedlhafd |  | **Assist. Lecturer** | **MSc, Jawaharlal Nehru tech. University, India, 2010** |  | **-** | **-** | **-** | **-** | **-** | **-** | **Assistant Head Department +Graduate Studies Load** | |
| Qais A.Rishaq | **FT** | **Assist. Professor** | **PhD, Basra University, Iraq, 2003** | **-** | **21** | **21** | **0** | **MAE317 // MAE327** | **21** | **14.30%** | **Chairman Responsibilities +Graduate Studies Load + Post Graduate Studies** | |
| Safaa A. S. Almtori | **FT** | **Assist. Professor** | **PhD, Basra University, Iraq, 1999/2000** | **IEEE, MPS** | **15** | **15** | **0** | **E127 // MAE325 // MAE413** | **15** | **20.00%** | **Graduate Studies Load** | |
| Haider M. Mohammed | **FT** | **Assist. Professor** | **Ph. D., Basrah University, Iraq, 2010** | **-** | **39** | **39** | **0** | **MAE214 // MAE224** | **39** | **28.00%** | **Scientific Assistant Dean** | |
| Atheed Habeeb Taha | **FT** | **Lecturer** | **PhD, Basrah University, Iraq, 2011** | **-** | **25** | **25** | **0** | **E321 // MAE415 // MAE423** | **25** | **28.00%** | **Cultural Relations Manager** | |
| Nuha Hadi Jasim | **-** | **Assist. Professor**. | **Ph.D., Basrah University, Iraq, 2014** | **-** | **25** | **25** | **0** | **MAE133 // MAE324** | **25** | **28.00%** | **Graduate Studies Load** | |
| Hayder A. Abood | **FT** | **Professor** | **Ph.D., Huazhong University of Science and Technology, Chaina, 2013** | **-** | **26** | **26** |  | **MAE212 // MAE222** | **26** | **34.60%** | **Scientific Affairs Manager** | |
| Emad Obed Bajee | **PT** | **Lecturer** | **Ph.D, Basrah University, Iraq, 2013** | **-** | **25** | **25** | **0** | **E311 // 321 // MAE411** | **25** | **28.00%** | **Graduate Studies Load+** | |
| Azzam Dawod Hassan | **PT** | **Lecturer** | **Phd,**  **Basrah University, Iraq, 2002** | **-** | **17** | **17** | **0** | **MAE217 // MAE227 // MAE424** | **17** | **23.50%** | **Graduate Studies Load** | |
| Khulood Ibraheem Dawood | **FT** | **Lecturer** | **Ph.D., Basrah University, Iraq 2012** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **Graduate Studies Load +Examination Committee Responsibilities** | |
|  |  |  |  |  |  |  |  |  |  |  |  | |
| Haider Kasem Meshry | **FT** | **Lecturer** | **Phd,**  **UNITED KINGDOM** | **-** | **10** | **10** | **0** | **MAE312 // MAE425** | **10** |  | **Graduate Studies Load** | |
| Safaa' Khairy Ja'az | **PT** | **Lecturer** | **Phd, UNITED KINGDOM** | **-** | **25** | **25** | **0** | **MAE118 // MAE128 // MAE322 // MAE412** | **25** | **25.00%** | **Examination Committee Responsibilities+ Graduate Studies Load** | |
| Atef Na'mah Jerad |  | **Lecturer** | **Phd,**  **Basrah University, Iraq, 2001** | **-** | **10** | **10** | **0** | **E114 // E124** | **10** |  | **Graduate Studies Load** | |
| Isra'a Habeeb Kadem | **PT** | **Lecturer** | **Ph.D, Basrah University, Iraq, 2014** | **-** | **25** | **25** | **0** | **MAE115 // MAE125** | **25** | **25.00%** | **Examination Committee Responsibilities +Graduate Studies Load** | |
| Asa'ad Abdul Sayed | **PT** | **Lecturer** | **Ph.D, CHINA** | **-** | **27** | **27** | **0** | **MAE215 // MAE225** | **27** | **30.00%** | **Graduate Studies Load** | |
| Sundus Khaleel Hussain | **PT** | **Assist. Lecturer** | **Msc,**  **MALAYSIA** | **-** | **10** | **10** | **0** | **MAE426** | **10** |  | **Graduate Studies Load** | |

**# Ph. D students**

**Table4.2: Faculty Involvement in Regular Committees at the Department Level**

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Committee** | **Members** | |
| **1** | **Scientific Advisory and Graduate Affairs Committee** | Safaa A. S. Almtori |  |
| **2** | **Examination Committee** | Dya'a Chaseb Ali |  |
| **3** | **Importation Committee** | Haider Qasim Meshri |  |
| **4** | **Summer Industrial Training Committee** | Safa Khairi Ja'as |  |
| **5** | **Gratis Book Committee** | Azzam Dawod Hassan |  |
| **6** | **Laboratory Maintenance Committee** | Qais A.Rishaq |  |
| **7** | **Quality Assurance Committee** | Nuha Hadi Jassim |  |

**4.4 Faculty Competencies**

The department offers a wide spectrum of courses in diverse areas of materials engineering courses that include, though not limited (Cad/Cam, materials behavior design, production, processes): **Table4.3** gives the names of faculty, area of interest, and current program curricula areas taught by each one of them.

**Table4.3: Faculty's Specialization and the Program Curriculum Areas**

|  |  |  |  |
| --- | --- | --- | --- |
| **Faculty** | **Area of Interest** | | **Curriculum Areas** |
| **General** | **Specific** |
| Qais A. Rishaq | Mechanical Engineering | Fluid | Fluid |
| Safaa A. S. Almtori | Applied Physics | Materials Physics | Materials Physics |
| Hayder A.Abood | Chemist | Inorganic Chemistry | Inorganic Chemistry |
| Nuha Hadi Jasem | Materials Engineering | Production | Production |
| Atheed Habeb Taha | Mechanical Engineering | Failure Mechanics | Failure Mechanics |
| Dhyaa Chaseb Ali | Mechanical Engineering | Applied Mechanics | Applied Mechanics |
| Haider Maath mahamed | Mechanical Engineering | Materials Failure | Materials Failure |
| Emad obed Bajee | Mechanical Engineering | Applied Mechanics | Applied Mechanics |
| Azam Dawod Hassan | Mechanical Engineering | Applied Mechanics | Applied Mechanics |
| Khulood Abrahem Dawood | Mechanical Engineering | Applied Mechanics | Powder Metallurgy |
| Haider Kasem Mashry | Physics | Liquid Crystals | Liquid Crystals |
| Safaa' KHaire Jaaz | Mechanical Engineering | Failure Mechanics | Failure Mechanics |
| Atef Namah Jerad | Mechanical Engineering | Production | Production |
| Isra'a Habeeb Kadem | Electrical Engineering | communication | communication |
| Asa'ad Abdul Sayed | Mechanical Engineering | Heat Mechanics | Heat transfer |
| Mohammad mustafa | Mechanical Engineering | Applied Mechanics | Vibration |
| Sundous Kahleel | Civil engineering | Engineering management | Engineering management |

**4.5 Faculty Size**

The total number of students in the department is 230 (2016/2017), and the number of the ME faculty members is 18. This data clearly indicates that, in terms of numbers, there has been no serious problem, thus far, in handling the teaching loads and current undergraduate students enrolled in the program. Thus, the students to faculty member ratio is more than12:1

The number of courses assigned to each faculty member, (lecturer and above), is two courses, as a maximum

**4.6 Interaction with Students**

Every faculty member in the department is requested to allocate a certain number of office hours, depending on his teaching load, per week. These office hours are mainly assigned for helping the students. She/ He has the responsibility of making the students aware of the scheduling of these hours. This interaction is much more manifested in; student advisory, supervision of senior projects, attending senior projects exhibitions, professional society advisory, and coordinating industrial training. **Table 4.4** shows the names of the selected faculty advisors and their number of advised students

**Table4.4: Number of Advisee per Selected Faculty Members**

|  |  |  |
| --- | --- | --- |
| **Advisor Name** | **Advisee Year** | **No. of Advisee** |
| Dr. Qais A .Rashiq – Dr.Haider Qasim Meshri | 4th Year | 37 |
| Dr. Emad Obaid Baji + Dr. Dyaa Chaseb A. | 3rd Year | 38 |
| Dr.Safaa A. Saleh + Dr.Safaa K. Ja'as | 2nd Year | 55 |
| Dr. Azzam D. Hassan + Dr. Nuha H. Jasim | 1st Year | 44 |

For this section, SWOT gives us:

|  |  |  |
| --- | --- | --- |
|  | Helpful  (to achieving the objective) | Harmful  (to achieving the objective) |
| Internal origin  (attributes of  the department) | **Strengths**   * Student to faculty ratio is 9:1 which is optimal. | **Weaknesses**   * The department is more inclined towards teaching rather than research. |
| External origin  (attributes of  the environment) | **Opportunities**   * The new adopted advising scheme will definitely improve the interaction between students and faculty members. | **Threats**   * The teaching load on most faculty members prevents them from assigning enough time for scientific research. |

**Chapter5: Criterion5 (Facilities)**

**5.1 Space**

The ME Department is part of the campus of the college of engineering in Qarmat Ali district, north of Basrah, Basrah, Iraq. The department occupies the second floor in the Mechanical engineering building, where the offices of the faculty members and the supporting staff as well as many of the classrooms and drawing offices. However, the main laboratories are situated on the ground floor of the same building. These offices comprise the following:

1. The administrative offices: these include the office of the Head with approximately 15 m2, in area.
2. Administrative Supporting Staff offices; these consists of:
   1. One full time secretary office, whose job is to administratively assist the department head; this office is 15 m2, in area, and is directly situated next to the Head’s office.
   2. The coordinator's office that is situated next to the secretary's office. The coordinator is a full-time faculty member who also, acts as the deputy head during the head's absence. This office is ≈ 14 m2, in area.

These three offices, the Head’s and the secretary’ combined, form the administrative offices of the Materials Engineering Department.

1. On the same level, the second floor of the mechanical engineering building, there are eight faculty members' rooms, each one of an area of ≈ 14 m2. Usually, each senior member of the staff occupies a separate room, is space is available. All faculty offices are well furnished and equipped with 1 PC and an **inactivated** link to Internet, as well as good air-conditioning system.
2. Storage rooms: There is a storage room of an area of (10 m2) in the department
3. Meeting room**:** this room is about 25m2, is mainly used for the departmental related meetings at different levels including discussions and examinations. This room is properly furnished and is equipped with a data show and, one PC.

**5.1.1 Classrooms**

The computer offices include 3 typical classrooms in the building that are equipped with the following items:

* 2X4 m2 Whiteboard
* Two classroom space areas of 3m X 10.5m (31.5 m2),and one other classroom space of an area ≈ 15m X 20 m (300 m2),
* Split air conditioning units with an adjustable temperature.
* Two adequate classroom sets of chairs for up to 50 chairs per classroom, and other 200 chairs

**5.1.2 Laboratories**

The department of materials engineeringlaboratory consists of one main large space covered room that is fully equipped, with a total area 300 m2, and is located on the ground floor of the mechanical engineering building, to the right-hand side of the main entrance. This room house a number of labs, where the basic experiments are performed to help the students understand the engineering concepts covered in their different courses. The Lab facilities could also be used for building the term projects and senior projects as well. The Materials Engineering Labs, however, are structured to be adaptable and upgradable to accommodate the inevitable changes in the ME curriculum. Sufficient efforts are exerted in order to make sure that the Lab equipment is kept in good operating conditions. A summary of the five departmental laboratories is given, below, in **Table 5.1**. In addition, it shows the courses associated with each laboratory.

**Table 5.1: Laboratories' Names, , and Associated Courses**

|  |  |
| --- | --- |
| **Laboratory' Name** | **Associated Courses** |
| **Metals Lab.** | **MAE436, MAE432,MAE133** |
| **Nonmetals lab** | **MAE236,** |
| **Chemical Metallurgy Lab** | **MAE233,** |
| **Computers Lab.** | **MAE435,MAE434, MAE337** |
| **Heat treatments Lab** | **MAE336** |

The materials engineering students’ utilization of the lab space and equipment could be assessed in terms of an index representing a ratio between the number of students registered in a certain lab and the lab space area, at a given time slot. This is shown in **Table 5.2**.

**Table5.2: Student Utilizing Space Area Ratio to Instructional laboratories Space Area**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Lab's Name** | **Sunday** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** |
| **Metallurgy Lab.** | **1st Semester** | | | | |
| **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** |
| **2nd Semester** | | | | |
| **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** | **Open all day**  **(9.26%)** |
| **Nonmetals Lab.** | **1st Semester** | | | | |
| **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** |
| **2nd Semester** | | | | |
| **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** |
| **Chemical metallurgy Lab.** | **1st Semester** | | | | |
| **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** |
| **2nd Semester** | | | | |
| **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** | **Open all day**  **(6.29%)** |
| **Computers Lab.** | **1st Semester** | | | | |
| **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** |
| **2nd Semester** | | | | |
| **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** | **Open all day**  **(8.57%)** |
| **Heat treatments lab.** | **1st Semester** | | | | |
| **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** |
| **2nd Semester** | | | | |
| **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** | **Open all day**  **(4.34%)** |

**5.2 Resources and Support**

**5.2.1 Department Library**

The department does not have its own library; rather its students use the main library of the college; the department only provides the gratis textbooks to students, where the student to book ratio ≈ 12:1.

**5.2.2 Laboratories**

As mentioned before, there are five main labs, in the department of materials engineering, which are fully utilized in the materials engineering courses, term projects and senior design projects as well. All the laboratories are air conditioned and the room temperatures are regularly monitored and controlled in order to ensure an acceptable working climate, in the normally hot climate of the Basra region.

The ME labs are well maintained and properly run by a designated laboratories maintenance committee and a technical supporting team of technicians.

Doing the SWOT analysis, we get:

|  |  |  |
| --- | --- | --- |
|  | Helpful  (to achieving the objective) | Harmful  (to achieving the objective) |
| Internal origin  (attributes of  the department) | **Strengths**   * Supporting laboratories with a number of new instruments and computers | **Weaknesses**   * The department building area is not adequate due to its incorporation with the mechanical engineering department. * The department has an Internet connection that does not work well. * Classrooms have no data show devices. * The department has no library of its own; it only has the gratis textbooks section. * The electrical main supply is through the mechanical engineering main board. * The department has five laborites and one workshop, with one technician assigned to each lab; this makes it difficult for them to perform their maintenance tasks efficiently. |
| External origin  (attributes of  the environment) | **Opportunities**   * The department hopes for a flexible organization to support the laboratories with a spectrum analysis machine and a high expensive construction of the department building. | **Threats**   * All laboratories (except one) are housed in one large room. In this way, when the national electricity is suddenly turned off; all the held experiments are shut down and need to be repeated. Furthermore, the department does not have its own power generator to feed the laboratories, |