Self-Assessment Report

Materials Engineering Department
College of Engineering,
University of Basra,
Basra, Iraq

2016-2017

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Chapter0: 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** administrative supporting staff 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	Assist. Professor	Dr. Hayder M. Mohammed
2	Professor	Dr. Adnan Shamkhy Jabur
3	Assist. Professor	Dr. Saad Matee Potrous
4	Assist. Professor	Dr. Qais A.Rishaq

5	Assist. Professor	Dr. Safaa A. S. Almtori
6	Assist. Professor	Dr. Hayder A.H. Abood
7	Lecturer	Dr. Atheed Habeeb Taha
8	Lecturer	Dr. Khulood Ibraheem Dawood
9	Lecturer	Dr. Emad Obaid Bajee
10	Lecturer	Dr. Dhiaa Chaseb Ali
11	Lecturer	Mr. Haider Kasem Meshri (PG)
12	Lecturer	Dr. Nuha Hadi Jasem
13	Lecturer	Dr. Azzam Dawod Hassan
14	Lecturer	Dr. Usama Jasem Naaem
15	Lecturer	Dr. Safaa' Khaire Jaaz -
16	Lecturer	Dr. Atef Namah Jrad
17	Lecturer	Dr. Esraa Habeeb Kadhem
18	Lecturer	Dr. Asa'ad Abdul Sayed
19	Assist. Lecturer	Mr. Mohammad Mustafa (PG)
Note: PG= Postgraduate student (i.e. Ph. D Students)		

3. The department also has engineers, technicians, and administrators employees with their names mentioned in **Table0.2**. 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
3	Miss. Zainab Ali Ahmed	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 Shanshoul	Diploma/ Laboratory Technician
7	Mrs. Wedad Ali Abdulhalem	Commerce School Graduate/ Library Administrator
8	Mrs. Wela'a Abdulameer Abdul Sayed	Primary School Graduate / Secretary
9	Mrs. Saadya Atwan Hashem	Services Assistant
11	Mr. Ali Hussen Thwayed	Diploma/ Engineering Workshop
12	Mr. Mohammed Fathee Shaker	Industrial School/ Engineering Workshop
13	Mr. Abdulkarem Taleb Salman	Industrial School/ Engineering Workshop
14	Mr. Gazee Hassan Mousa	Industrial School / Engineering Workshop
15	Mr. Fareed Abdullateef Salman	Industrial School/ Engineering Workshop
16	Mr. Hamed Kasem Ali	Industrial School/ Engineering Workshop
17	Mr. Ahmed AbdulKader Azeez	Industrial School/ Engineering Workshop
18	Mr. Abdulrazzaq Mohammed Lazim	Primary School / Engineering Workshop
19	Mrs. Zekkeya Hameed Athary	Services/ Engineering Workshop

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

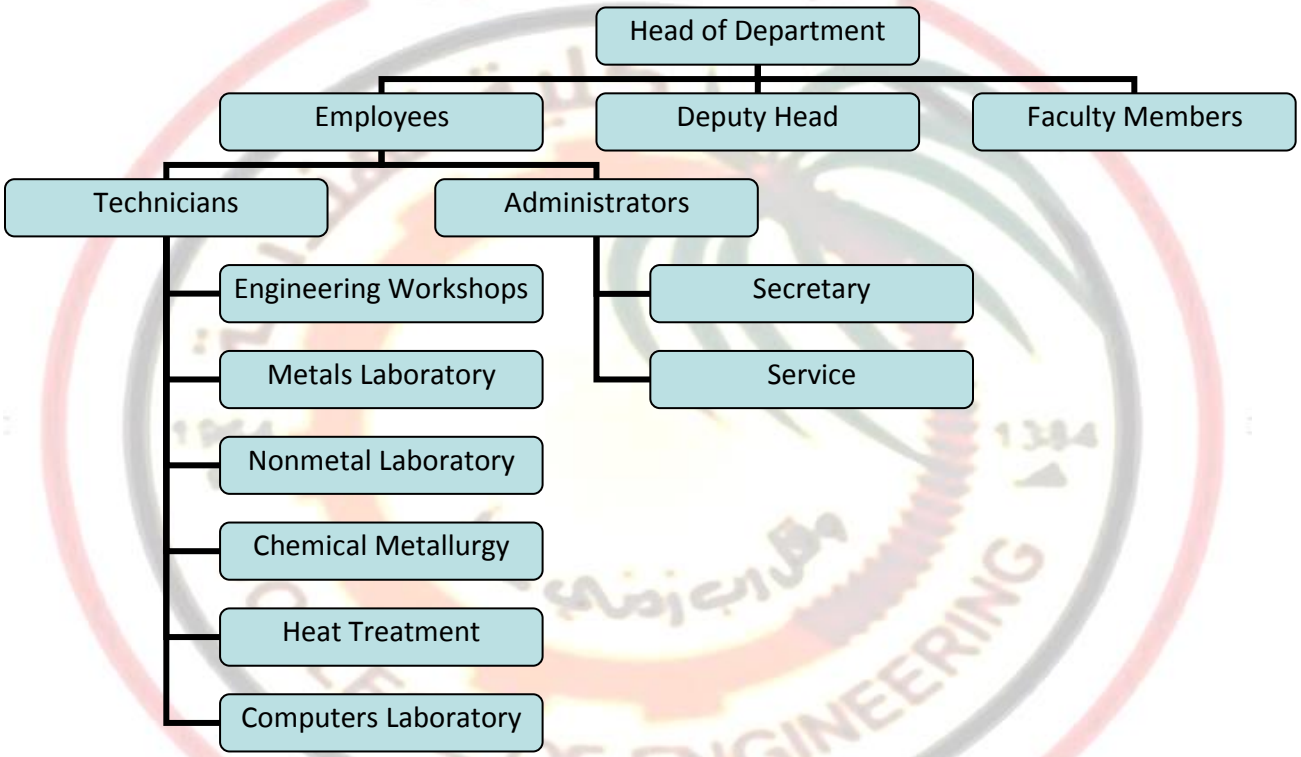
Table0.3: Departmental Committees

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



Carrying out a SWOT analysis for this section, gives:

Helpful	Harmful
(to achieving the objective)	(to achieving the objective)

	Strengths	Weaknesses
Internal origin (attributes of the department)	- 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	- 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	Threats
- 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.	- 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
2016-2017	88	64
2015-2016	89	65
2014-2015	88.4	85
2013-2014	89	84
2012-2013	89	86

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:
    a. Evaluation meetings: assess the student's readiness and abilities and accordingly determine the best advisory approach to follow.
    b. 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.
    c. 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 **157** 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. 30/38 credits (78.95 %) as Materials Engineering requirements

2. 4/38 credits (10.525 %) as College requirements

3. 4/38 credits (10.525 %) as University requirements

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

1. 37/45 credits (82.22%) as Materials engineering courses requirements

2. 4/45 credits (8.89%) as College courses requirements

3. 4/45 credits (8.89%) 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. 34/38 credits (89.47%) as Materials Engineering requirements

2. 4/38 credits (10.53%) as College requirements

3. 0/38 credits (0%) as University requirements

Overall Credit Percentage over the four years:

1. 131/157 credits (83.44 %) as Materials engineering requirements

2. 18/157 credits (11.465 %) as College requirements

3. 8/157 credits (5.095 %) 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	2012-2013	2013-2014	2014-2015	2015-2016	2015-2016
Full-time students	211	231	275	275	189
No. of Graduates	38	37	65	55	52
No. of New students	86	84	85	65	64

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
2016-2017	0	10
2015-2016	4	29
2014-2015	6	59
2013-2014	0	1
2012-2013	0	14

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.

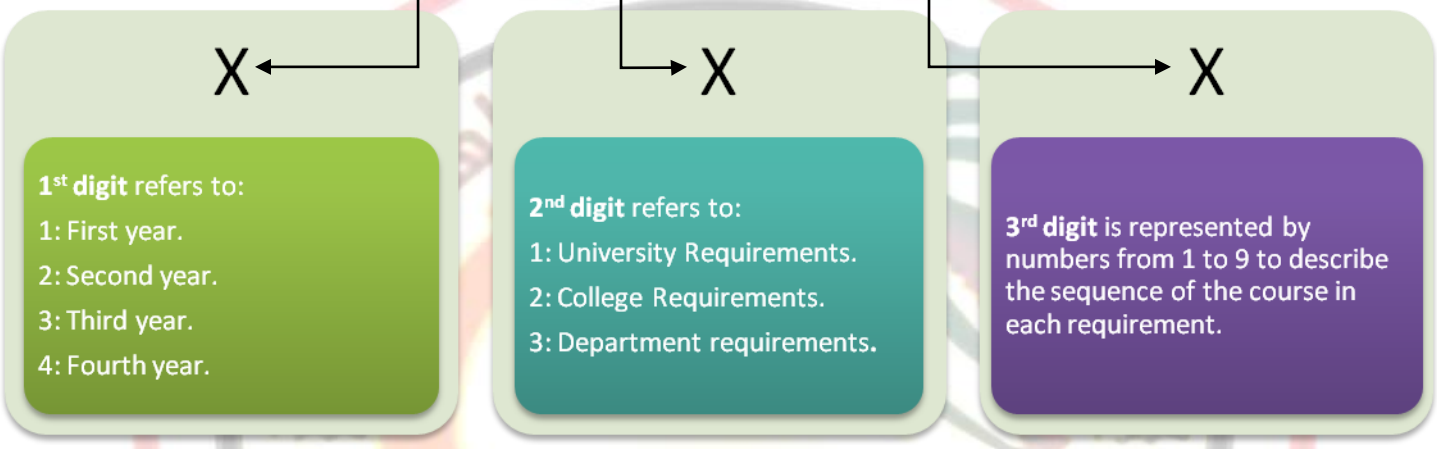
Chapter3: Criterion3 (Curriculum)

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 = ME + 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**.

2. Required or elective: whether it is a required course for the program or an elective one.
3. Course description: defines what the course is designed for and why it is given to the students.
4. Recommended Textbook(s): the recommended textbook(s) or the internet articles to teach this course
5. Prerequisites (if any): these have been established to assure an adequate and uniform background for students in advanced classes.
6. Course Topics: detailed syllabus of the course
7. 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 1	Year 2	Year 3	Year 4
Engineering Mechanics	Mathematics 2 **	Engineering and Numerical Analysis **	Mechanical Design by Computer
Mathematics 1 **	Computer Programming	Heat Transfer	Design and Selection of Engineering Materials
Methods of Extracting Engineering Materials	Mechanical Drawing	Vibrations & Theory of Machines	Technology of Engineering Materials 2
Fundamental of Metals Production Engineering	Chemical Metallurgy	Behavior of Engineering Materials	Stresses Analysis and Plasticity
Fundamental of Electrical Engineering	Engineering Metallurgy	Technology of Engineering Materials 1	CAD/CAM
Engineering Drawing**	Mechanics of Materials	Electrical Engineering Materials	Testing of Engineering Materials
Principles of Computer Science*	Democracy & Freedom Concepts *	Heat Treatments of Engineering Materials	Industrial Engineering
Chemistry and Physics	Fundamental of Thermodynamics	Nonmetallic Engineering Materials	Engineering Project **
		Summer Training	

University Requirements *
College Requirements **
Department Requirements

Table3.1: ME Curriculum Requirements

Total ME Requirements: 157 credit hours / 33 courses	
Requirements	**Credit Hours**
University Requirements	9
College Requirements	30
Department Requirements	118
Total	**157**

University Requirements: 9 credit hours / 4 courses			
Course No.	**Course Title**	**Credit Hours**	**Weekly Hours**
ME111	Principles Computer Programming	**5**	**5**
ME211	Democracy and Freedom Concepts	**4**	**2**
	Total	**9**	**7**

College Requirements: 30 credit Hours / 12 courses					
Course No.	**Course Title**	**Credit Hours**	**Weekly Hours**		
			Theory	**Tut.**	**Lab.**
ME121	Mathematics I	**6**	**3**	**1**	
ME122	Chemistry and Physics	**4**	**2**		
ME123	Engineering Drawing	**5**	**1**		**3**
ME221	Mathematics II	**4**	**3**	**1**	
ME321	Engineering and Numerical Analysis	**7**	**3**	**1**	**2**
ME421	Engineering Project	**4**		**1**	**3**
	Total	**30**	**12**	**4**	**8**

Department Requirements: 118 credit hours / 24 courses					
Course No.	**Course Title**	**Credit Hours**	**Weekly Hours**		
			Theory	**Tut.**	**Lab.**
ME131	Engineering Mechanics	**6**	**3**	**1**	
ME132	Methods of extracting engineering materials	**4**	**2**	**1**	

ME133	Principles of Production Engineering	**5**	**2**		**2**
ME134	Fundamentals of electrical engineering	**5**	**2**		**2**
ME231	Computers programming	**6**	**2**		**2**
ME232	Mechanical drawing	**3**			**3**
ME233	Chemical metallurgy	**5**	**2**	**1**	**2**
ME234	Engineering metallurgy	**5**	**2**		**2**
ME235	Mechanics of Materials	**7**	**3**	**1**	**2**
ME236	Fundamental of thermodynamics	**5**	**3**		**2**
ME331	Heat Transfer	**5**	**2**	**1**	**2**
ME332	Vibrations and theory of machines	**5**	**2**	**1**	**2**
ME333	Behaviour of engineering materials	**6**	**3**	**1**	
ME334	Technology of engineering materials 1	**4**	**3**	**1**	
ME335	Materials Electrical Engineering	**5**	**2**		**2**
ME336	Heat treatments of engineering materials	**5**	**2**	**1**	**2**
ME337	Nonmetallic engineering materials	**5**	**2**	**1**	**2**
ME431	Mechanical Design by Computer	**5**	**2**	**1**	**2**
ME432	Design and Selection of engineering materials	**5**	**2**	**1**	**2**
ME433	Technology of engineering materials 2	**5**	**2**		**2**
ME434	Stresses analysis and Plasticity	**4**	**2**		**2**
ME435	CAD/CAM	**5**	**2**	**1**	**2**
ME436	Engineering materials Testing and Quality control	**4**	**2**		**2**
ME437	Industrial Engineering	**4**	**2**		
Total		**118**	**51**	**13**	**39**

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												
ME111	Fundamental of computer science	X	X			X		X	X	X	X	X
ME121	Mathematics 1 **	X				X		X	X		x	
ME122	Physics and Chemistry**		X			X	X					X
ME123	Engineering drawing				X			X		X		X
ME131	Engineering mechanics	X	X			X						X
ME132	Methods of extracting engineering materials	X	X	X					X			X
ME133	Fundamental of Materials production engineering	X	X	X		X		X	X	X		X
ME134	Fundamental of electrical engineering	X	X	X		X			X			X
Second Year												
ME211	Democracy and freedom concepts						X		X			
ME221	Mathematics II	X				X		X	X	X	X	
ME231	Computers programming	X	X			X		X	X	X	X	X
ME232	Mechanical drawing	X		X					X			X
ME233	Chemical metallurgy	X				X			X			X
ME234	Engineering metallurgy	X	X	X		X		X	X	X		X
ME235	Mechanics of Materials	X	X	X		X			X			X
ME236	Fundamentals of thermodynamic	X	X	X					X			X

Third Year												
ME331	Heat Transfer	X	X	X					X			X
ME332	Vibrations and Theory of machines	X		X		X			X		X	X
ME333	Behavior of engineering materials	X	X	X		X		X	X	X		X
ME334	Technology of materials engineering 1	X	X	X		X		X	X	X		X
ME335	Materials electrical engineering	X	X	X		X		X	X	X		X
ME336	Heat Treatments of engineering materials	X	X	X					X			X
ME337	Nonmetallic engineering materials	X	X	X		X		X	X	X		X
ME321	Engineering and Numerical analysis	X				X		X	X	X	X	X
Fourth Year												
ME421	Engineering Project	X	X	X	X	X	X	X	X	X	X	X
ME431	Mechanical design by computer	X	X	X		X			X		X	X
ME432	Design and Selection of engineering materials	X	X	X		X			X		X	X
ME433	Technology of engineering materials 2	X	X	X		X		X	X	X		X
ME434	Stresses analysis and Plasticity	X	X			X			X		X	X
ME435	CAD/CAM	X	X	X		X			X		X	X
ME436	Testing of materials engineering	X	X	X		X		X	X	X		X
ME437	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:
    a. Laplace and Fourier analysis: Laplace transform and applications, Fourier series (Trigonometric, exponential, complex), odd and even symmetry, half-symmetry, Fourier transform, properties and applications.
    b. Complex Variables: complex integrals and differentiations.
    c. Fundamentals of Probability Theorem: definitions, probability density function, distribution functions (uniform, binomial, normal, etc), mean, variance, moments.
2. Numerical Analysis:
    a. Solution of System of Linear Equations: Gauss elimination, Gauss- Jordan method, Matrix inversion by Gauss-Jordan method, Gauss- Seidal iteration method.
    b. Solution of Non Linear Equations: Bisection method, False-Position method, Newton-Raphson method.
    c. Solution of Simultaneous non linear equations: Newton-Raphson method, the method of iteration.
    a. 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 2^{nd} and 4^{th} 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.

6. 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
7. 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
8. 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
9. 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
2. 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.

3. 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:

- 4 Assistant Professors
- 7 Lectures
- 7 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 2016-2017

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
Dhia'a CH. Ali		Lecturer	Ph. D, Basrah University, Iraq, 2008		22	22	0	ME431(3)	22	22.70%	Chairman Responsibilities +Graduate Studies Load + Examination Committee Responsibilities	
Mohammed M.Abedlhafd		Assist. Lecturer	MSc, Jawaharlal Nehru tech. University, India, 2010		30	30		ME332(3),ME136(2)		16.67%	Graduate Studies Load	
Qais A.Rishaq	FT	Assist. Professor	PhD, Basra University, Iraq, 2003	-	21	21	0	ME336(3)	21	14.30%	Graduate Studies Load + Post Graduate Studies	
Safaa A. S. Almtori	FT	Assist. Professor	PhD, Basra University, Iraq, 1999/2000	IEEE, MPS	15	15	0	ME137(2)	15	20.00%	Graduate Studies Load	
Saad Matti Potrous	FT	Assist. Professor	PhD, University of Dundee, U.K., 1990		18	18		ME133(2)		33.33%	Graduate Studies Load	

Haider M. Mohammed	FT	Assist. Professor	Ph. D., Basrah University, Iraq, 2010	-	39	39	0	ME235(2)+ME131(4)	39	28.00%	Graduate Studies Load+ Post Graduate Studies + Director of Quality Assurance department Responsibilities
Atheed Habeeb Taha	FT	Lecturer	PhD, Basrah University, Iraq, 2011	-	25	25	0	ME435(2),ME221(4)	25	28.00%	Graduate Studies Load+ Examination Committee Responsibilities
Nuha Hadi Jasem	-	. Lecturer	Ph.D., Basrah University, Iraq, 2014	-	-	-	-	-	-	-	Maternity leave
Hayder A. Abood	FT	Lecturer	Ph.D., Huazhong University of Science and Technology, Chaina, 2013	-	26	26		ME233(2),ME137(2)	26	34.60%	Graduate Studies Load+ Examination Committee Responsibilities
Emad Obed Bajee	PT	Lecturer	Ph.D, Basrah University, Iraq, 2013	-	25	25	0	ME434(4),ME337(4)	25	28.00%	Graduate Studies Load
Azzam Dawod Hassan	PT	Assist. Lecturer	MSc, Basrah University, Iraq, 2002	-	17	17	0	ME121(4)	17	23.50%	Graduate Studies Load
Khulood Ibraheem Dawood	FT	Lecturer	Ph.D., Basrah University, Iraq 2012	-	25	25	0	ME333(4), ME234(2)	25	24.00%	Graduate Studies Load+ quality assurance Responsibilities
Usama Jasem Naem	FT	Lecturer	Ph.D, Basrah University, Iraq, 2014	-	27	27	0	ME437(2),ME131(4)	27	30.00%	Graduate Studies Load+ Examination Committee Responsibilities

Haider Kasem Meshry #	FT	Lecturer	MSc, Basrah University, Iraq 2012	-	10	10	0	-	10		PhD Student
Safaa' Khairy Ja'az #		Assist. Lecturer	MSc, Basrah University, Iraq 2002					PhD Study Leave			PhD Student
Atef Na'mah Jerad #		Assisst. Lecturer	MSc, Basrah University, Iraq, 2001	-	10	10	0	PhD Study Leave	10		PhD Student
Isra'a Habeeb Kadem	PT	Lecturer	Ph.D, Basrah University, Iraq, 2014	-	25	25	0	ME437(1),ME131(3)	25	25.00%	Graduate Studies Load
Asa'ad Abdul Sayed	PT	Lecturer	Ph.D, Basrah University, Iraq, 2014	-	27	27	0	ME437(2)	27	30.00%	Graduate Studies Load+ Student Committee Responsibilities

 # 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 Haider Maath mahamed -
2	**Examination Committee**	Dya'a Chaseb Ali Haider Maath mahamed -
3	**Importation Committee**	Atheed Habeeb Taha -
4	**Summer Industrial Training Committee**	Mohammad mustafa -
5	**Gratis Book Committee**	Azzam Dawod Hassan -
6	**Laboratory Maintenance Committee**	Qais A.Rishaq -
7	**Quality Assurance Committee**	Emad Obaid Bajee -

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
Saad Mtee Potrous	Applied Physics	Materials Physics	Materials Physics
Hayder A.Abood	Chemist	Inorganic Chemistry	Inorganic Chemistry
Naha 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
Usama Jasem Naem	Mechanical Engineering	Applied Mechanics	Vibration
Mohammad mustafa	Mechanical Engineering	Applied Mechanics	Vibration

4.5 Faculty Size

The total number of students in the department is 230 (2015/2016), 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 Abdlhassan	4th Year	37
Dr. Khulood Ibraheem + Dr. Dyaa Chaseb A.	3rd Year	38
Dr.Safaa A.Saleh + Dr.Hayder M.Mahamed	2nd Year	55
Dr. Saad Matti + Dr.Atheed H.Taha	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 m^2, in area.
2. Administrative Supporting Staff offices; these consists of:
    a. One full time secretary office, whose job is to administratively assist the department head; this office is 15 m^2, in area, and is directly situated next to the Head's office.
    b. 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 $\approx$ 14 m^2, in area.

    These three offices, the Head's and the secretary' combined, form the administrative offices of the Materials Engineering Department.
3. On the same level, the second floor of the mechanical engineering building, there are eight faculty members' rooms, each one of an area of $\approx$ 14 m^2. 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.
4. Storage rooms: There is a storage room of an area of (10 m^2) in the department

5. Meeting room**:** this room is about 25 m^2, 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 m^2 Whiteboard
- Two classroom space areas of 3m X 10.5m (31.5 m^2),and one other classroom space of an area ≈ 15m X 20 m (300 m^2),
- 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 engineering laboratory consists of one main large space covered room that is fully equipped, with a total area 300 m^2, 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.	ME436, ME432,ME133
Nonmetals lab	ME236,
Chemical Metallurgy Lab	ME233,
Computers Lab.	ME435,ME434, ME337
Heat treatments Lab	ME336

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	Open all day	Open all day	Open all day	Open all day

	(8.57%)	(8.57%)	(8.57%)	(8.57%)	(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,