Ministry of Higher Education & Scientific Research

University of Baghdad – College of Engineering

Mechanical Engineering Department

Reviewed Self-Assessment Report
Mechanical Engineering Program
Mechanical Engineering Department
College of Engineering – University of Baghdad

September 2012 **Shawal 1433**

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PREFACE

The present report is the second self-assessment report written for the Department of ME Mechanical Engineering at the College of Engineering - University of Baghdad. It represents a modification to the first report written at September / 2011. The two reports represent an important step towards achieving Quality Assurance in accordance with international standards, which is a strategic and important decision for the scientific and educational process of the department. As mentioned in the first report, the decision was adopted by the "General Board" of the department (which includes in its membership all members of the faculty in the department) at its meeting on June 30, 2011. The reports coincide with a wide and comprehensive campaign carried out by the College of Engineering and University of Baghdad in this area and under a central guidance and support from the Iraqi Ministry of Higher Education and Scientific Research (MOHESR).

In writing the present report, we have relied mainly on the comments and recommendations made by the reviewers in *Arbil Workshop*. Besides, we also rely on template of a self-assessment report issued by the UNESCO Iraq Office (Amman), in addition to a number of similar reports of a number of Arab and international universities that have already presented such a report. **The report involves up-dating to what was written in the first report**. It includes in its first and second parts a definitive introduction to the department and its history, scientific disciplines and awarded degrees, the system of study and curriculum, organizational structure, the general features of the policy of the department in the various fields and aspects ... etc. After that, the report reviews the required criteria for the self-assessment and the related appendices according to specifications of SAR. Its also contains a SWOT analysis for the (Strengths, Weaknesses, Opportunities, and Threats) of the department. SWOT analyses is a very important tool for planning and developing strategies and policies for the office in question, and we have tried in our writing of this paragraph to be very precise in our diagnosis of the strengths and weaknesses, as well as opportunities and threats facing the scientific and educational process of the department. **In addition to that, the report includes the important actions made and / or proposed to be made by the department according to the SWOT analysis. Criterion 9 related to the scientific research was added to the present report.**

We hope that we have been successful in our writing of this report, and that we achieve the minimum requirements of SAR. We hope that the report receives the attention of the experts and reviewers and to enrich it with their valuable observations to help us in guiding the department in the right direction towards ensuring quality and reliability of the educational system of ME program according to international specifications and standards.

God Grants Success……..

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BACKGROUND INFORMATION

A. *Contact Information*

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B. The Program History

The Department of M E at the University of Baghdad is the oldest among all the Iraqi Universities and Institutes. The department was established in 1950. The duration of study was four years, after which the graduate obtains a bachelor degree in ME. A five years study system was introduced in 1971 for the first time, but was returned to a four years system the following year. Specialization used to begin in the fourth year of study in four specialties of mechanical engineering, these are; (Power, Design, Manufacturing, and Textile).

The study in the department continued in this manner until after the mid eighties where the College of Engineering was relocated from its former building at Bab Al-Muathem campus to its current buildings at Aljaderiya campus. After this relocation, the two specialties of (Agricultural Machinery Engineering) and (Textile Engineering) were separated from the ME Department to become the core for the formation of the ME Department at the College of Engineering / Al-Mustanseriya University, which used the College of Engineering's old buildings. In the academic year (1990-1991), the specialty of (Aeronautical Engineering) was established as a new specialty in addition to the (General Mechanics) specialty. The specialization starts from the third year.

The postgraduate studies in the department started at the academic year (1971–1972) to obtain the M.Sc. degree in ME in two fields; (Power) and (Mechanical Design). In the academic year (1976–1977) the Higher Diploma degree study started. The Ph.D. degree study started at the academic year (1982–1983).

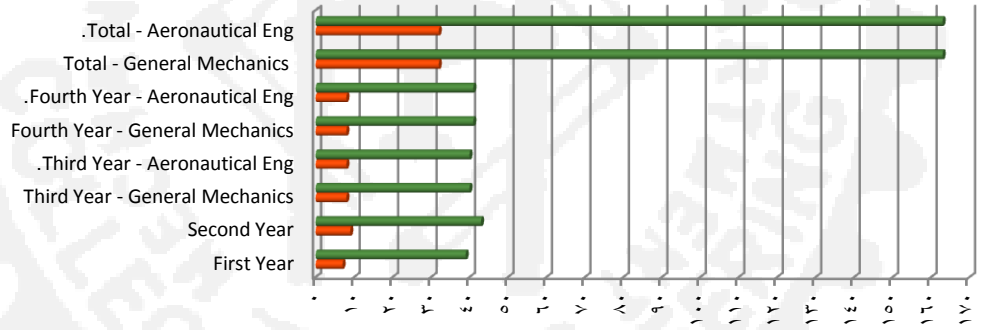
C. *Options: The Scientific Specialties and the Awarded Degrees*

The department offers engineering programs leading to the degree of Bachelor of Science (B.Sc.), Master of Science (M.Sc.) and Degree of Philosophy (Ph.D.) in Mechanical Engineering. The B.Sc. degree includes two specialties; the ***"General Mechanics"*** and the ***"Aeronautical Engineering"***, which was established at 1990 for the first time in the department, whereas the M.Sc. and Ph.D. degrees cover four areas of research; ***Thermo-Fluids, Applied Mechanics, Manufacturing of Engineering Materials and Industrial Engineering***.

The annual system of study is followed in the department for the (B.Sc.) undergraduate study. The study period is 4 years with 163 units distributed over the four years of study. The specialization in one of the two specialties; the ***"General Mechanics"*** and the ***"Aeronautical Engineering"*** is at the third and fourth years of study. Figures (0-1 & 0-2) show the number of units, subjects and the weekly hours of study for all stages. Figure (0-3) shows the percentage of units and subjects distributed according to the requirements of the university, basic sciences, general specialty and specific specialty.

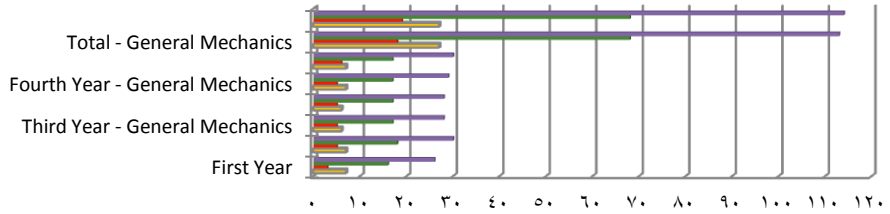
For the postgraduate study, the semester's system of study is followed in the department. The minimum period of study is 2 years for the M.Sc. and 3 years for the Ph.D. degrees. The first year for both studies is for courses work with two semesters. The second year for M.Sc. is for thesis work, with two semesters also. The second and third years for Ph.D. are for dissertation work, with four semesters. The Ph.D. student had to pass a comprehensive exam before he can register on a dissertation. Figure (0-4) shows the number of units, subjects and the weekly hours of study for M.Sc. and Ph.D. studies for all specialties.

Figure (0-1): Number of Subjects and Units for all Department Stages



	First Year	Second Year	Third Year - General Mechanics	Third Year - Aeronautical Eng.	Fourth Year - General Mechanics	Fourth Year - Aeronautical Eng.	Total - General Mechanics	Total - Aeronautical Eng.
Units	٣٩	٤٣	٤٠	٤٠	٤١	٤١	١٦٣	١٦٣
Subjects	٧	٩	٨	٨	٨	٨	٣٢	٣٢

Figure (0-2): Number of Weekly Hours for all Department Stages



	First Year	Second Year	Third Year - General Mechanics	Third Year - Aeronautical Eng.	Fourth Year - General Mechanics	Fourth Year - Aeronautical Eng.	Total - General Mechanics	Total - Aeronautical Eng.
Total	٢٦	٣٠	٢٨	٢٨	٢٩	٣٠	١١٣	١١٤
Theoretical	١٦	١٨	١٧	١٧	١٧	١٧	٦٨	٦٨
Tutorial	٣	٥	٥	٥	٥	٦	١٨	١٩
Experimental	٧	٧	٦	٦	٧	٧	٢٧	٢٧

Figure (0-3): Percentages of Units of the Department Undergraduate Curricula
(General Mechanics + Aeronautical Engineering)

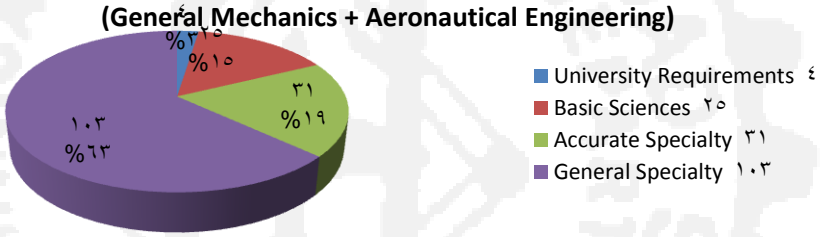
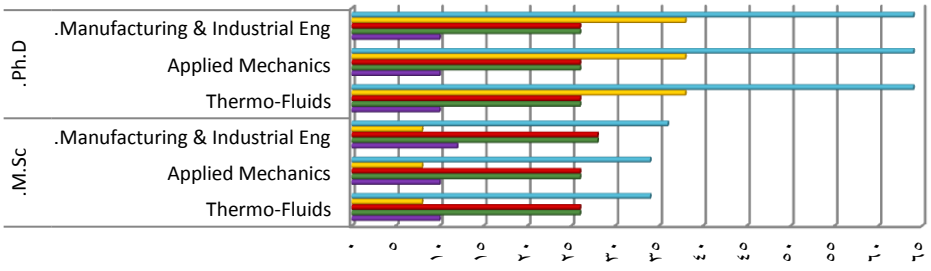


Figure (0-4): Number of Subjects, Weekly Hours and Units for Postgraduate Studies



	M.Sc.			Ph.D.		
	Thermo-Fluids	Applied Mechanics	Manufacturing & Industrial Eng.	Thermo-Fluids	Applied Mechanics	Manufacturing & Industrial Eng.
Total No. of Units	٣٤	٣٤	٣٦	٦٤	٦٤	٦٤
No. of Thesis or Dissertation Units	٨	٨	٨	٣٨	٣٨	٣٨
No. of First Year Units	٢٦	٢٦	٢٨	٢٦	٢٦	٢٦
No. of Weekly Hours	٢٦	٢٦	٢٨	٢٦	٢٦	٢٦
No. Subjects	١٠	١٠	١٢	١٠	١٠	١٠

D. *Organizational Structure*

The scientific, technical and administrative structure of the ME Department at the College of Engineering – University of Baghdad includes a set of integrated elements. Each one of these elements of the structure has authorities, duties and responsibilities which are specified accurately so that the department can works well and achieve the required goals through the integrity of work of these elements. Figure (0-5) shows the organizing structure of the department.

Each person in this structure has his duties and responsibilities that are specifically defined so that the department may achieve its objectives and perform its work ideally as a result of the integration between the personal. Appendix A presents the most important activities of the department during the academic year 2011-2012, which are the results of integration between the elements of this structure.

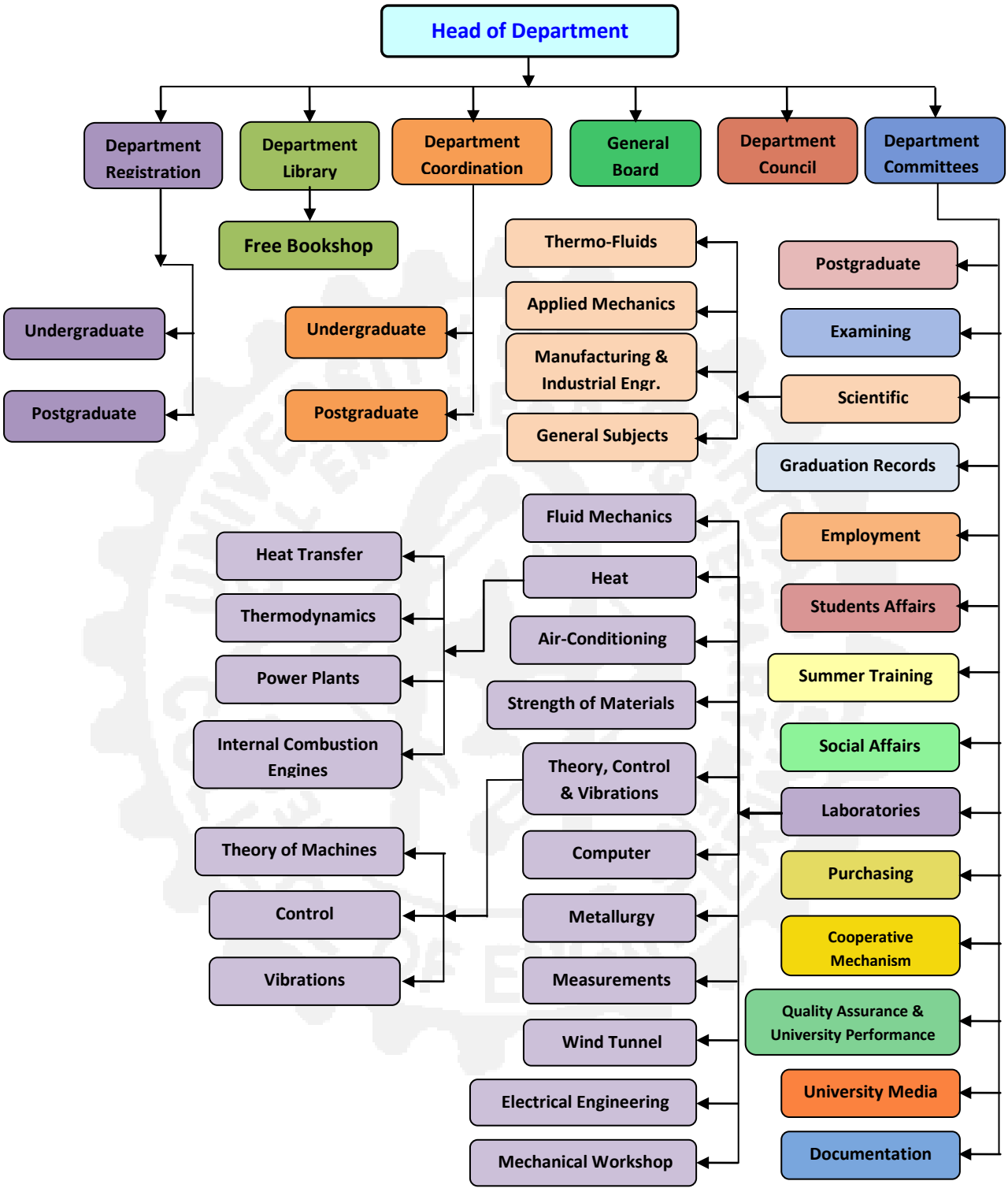


Figure (0-5): Organizing Structure of MED

E. *Program Delivery Mode*

There is only one mode of delivery, which is a "Day Program". The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Each graduating student has to successfully complete 163 credits. Each subject credit is one 50-minute lecture a week or 3 hours of lab a week. There is *no* on-line subject which may be used as supplementary material for the class room instruction.

F. Deficiencies, Weaknesses Documented in the First Report from the Previous Evaluation(s) and the Actions taken to Address them

This section includes the weaknesses and threats documented in the first SAR written at Sep. / 2011, and the important actions made and / or proposed to be made by the department to treat the weaknesses and risks associated with the educational process.

Students		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- Deficiencies in certain outcomes in graduating students. **a.** Communication skills. **b.** Design / real world applications. **c.** Contemporary technical and economic issues. **d.** Impact of engineering solutions in a global and societal context. - Quality and quantity of current students. **a.** Culture of being "spoon-fed". **b.** Inadequatelanguage preparation. **c.** Student be admitted in the section is not chosen either because of the rate either because of an error in filling out a form choices **d.** Inadequate training in critical or analytical thinking - Inappropriate mode of teaching. - Weak contact and alumni relations.	- Competition (local, regional and global). **a.** Emerging local and regional private colleges. **b.** Accessibility of international schools via distance education. **c.** Fast pace of developments in technology (e.g. IT, emerging new fields). **d.** Start the establishment of private universities in neighboring countries and the opening of branches in Iraq. **e.** Weaknesses in general level of scientific awareness of society. - Declining interest in engineering. a. Lack of sufficient number of quality students with strong interest in engineering. b. Inadequate public awareness for engineering profession and job opportunities. - Quality of incoming students (language, analytical thinking, motivation).	**1.** A proposal will be submitted to the **2.** MOHESR about the acceptance rules **3.** The extracurricular of the students was increased during the academic year 2011-2012. **4.** To establish a recruitment center. **5.** Developing summer training. **6.** Promote a strong sense of community & collegiality among the students, faculty, staff & alumni. **7.** Improve teaching &learning through continuous assessment. **8.** Continue to develop and maintain an adequate infrastructure. **9.** Development of comprehensive strategy for teaching the English language. **10.** It was decided to hold a meeting for groups of alumni.

Students		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- There is no division or unit sponsoring Graduate Affairs and communicate with them so that the process of issuing documents done by graduates and Registration Unit in the Department - There is no electronic link within a site Department Alumni so they can communicate with them and take advantage of the opinions (Feedback) in the improvement and development of teaching and learning processes and the extent to which the Survey educational objectives of the Department. - Lack of regular meetings for students with the slide of advanced engineers in the field work which weakens a link student field work as well as weaken the ambition to be one day a leader in the field of work. - Do not activate the relations between our department and corresponding colleges regionally and globally, where the existence of such agreements so lets awarded fellowships by the two parties to exchange experiences and increase the efficiency of students. - There is no way to assess students' only exams, in addition to the absence of mechanisms to follow up on their progress or delay in the scientific process.	- Increased competition from private colleges and universities and Arab World in subspecialty programs. - The lack of graduates access to jobs, whether governmental or private sector because of the lack of knowledge of these institutions with the skills possessed by graduates.	**11.** This can be achieved through the development of a clear strategy for teaching and learning. **12.** As is obvious that such meetings significant benefits can be obtained from these engineers to develop and improveprograms Department in addition to the possibility of marketing graduates through the establishment of relations with the working market

Program Educational Objectives		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- There are no message and vision at the educational program level. - There are no educational goals at the level of the educational program. - No measurement criterion exists for achievement of the goals.		1. A clear mission and vision statements h as been written. 2. Formulation of objectives for each educational program. 3. A statements of consistency between the objectives of educational program and scientific mission of department and college had been developed. 4. A clear strategy for measurement criterion for goals achievement has to be drawn and followed
Learning Outcomes		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- Lack of adequate security situation to visit the audit committees of organizations granted accridtation. - The lack of methods for measuring and evaluating the learning outcomes. - The style of the given curriculum tends to make the student recipients and not learner. - The lack of feedback	- Lack of adequate security situation to visit the audit committees of organizations granted accridtation - Lack of awareness required in the surrounding environment education needed for development	1. Starting to write each subject curriculum. 2. Proposing a measurement and evaluation strategy of learning outcomes achieved in each subject. 3. Development of the graduation project to resemble the design stage. 4. Establishing an advisory committee of field working. 5. Educate faculty members about learning outcomes and educational objectives.

Curriculum		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- Central control of curriculum development by the sectoral committee in the ministry, and the possibility of changes in the curriculum only in a limited rate. - Lack of attention to give courses in English, especially in the scientific discussion within the classroom. - The style of the given curriculum tends to make the student recipients and not learner. - Lack of allocation enough credit hours to acquire good skills in computer programs that needed for the mechanical engineer. - Lack concentration of curriculum to teach students to work inteam. - The absence of a written plan for review update curricula every four years, and the absence of mechanisms to take the views of those involved in the labor market program Department. - Methods for measuring learning outcomes and skills acquired by the students are not clear and need to develop new mechanisms to adapt with the requirements of the (ABET).	- Quality of incoming students (language, analytical thinking, motivation).	1. Designed to meet both local needs and international standards. 2. Strong engineering science components. 3. Availability of a good variety of general education subjects. 4. A strong professional component.

Academic Buildings and Facilities		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- Complicated decision-making and restrictive process at the College level for purchasing and hiring procedures. - Insufficient funding for maintaining and upgrading facilities. - Centrality of work which limits the possibility of development. - Exploitation of buildings from other colleges - The furnishing of classrooms is modest. - Need labs section to a large number of devices so they can be considered as an integrated part of the laboratories.	- Lack of adequate security. - Lack of awareness required in the surrounding environment education needing for developmen - Intense competition from new and private colleges of higher financial support compared to the old College of Engineering, which caused the low level of infrastructure compared to the modern college.	**1.** Rehabilitations of existing buildings. **2.** Furnishing rooms **3.** Equipping laboratories with new devices and equipment **4.** Processing computers **5.** Processing system Internet

Faculty		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- Increasing proportion of new faculty with limited teaching experience due to inadequate training programs for development. - Large proportion of faculty with limited industrial and research experience. - Poor rehabilitation programs for faculty members. - Poor relationship with international research centers and academic institutions. - Insufficient funding for faculty development. - The Department is still in need of a number of lecturers from the campaign of scientific titles (professor and assistant professor) for a number of subspecialties. - Despite the presence of the few opportunities for friction institutions scientific and academic world, but most of the teaching staff of the department is not familiar with the modern methods used in teaching and learning processes, although the existence of a training program staffs teaching outside of Iraq, which is sponsored by the Ministry does not cover a large number of lecturers in addition tolimited time program, which must be no more than a month according to the Ministry's instructions and complex procedures while getting this opportunity.	- Competition (local, regional and global). **a.** Emerging local and regional private colleges. **b.** Private universities in neighboring countries which have branches in Iraq. **c.** Weaknesses in general level of scientific awareness of society. - Declining interest in engineering. - Reduced financial support for professor as a scientific researcher, leading to a reduction in the level of research, where publishing in international scientific journals is the basis for enhancing the reputation of the college and then the university to be in level of international universities	**1.** Submit proposals to the ministry of higher education about faculty development. **2.** Activation of the Continuous education center. **3.** Activate relations with field work. **4.** Honoring, caring and retain outstanding faculty and staff. **5.** Improve teaching and learning through continuous assessment. **6.** Promote research &consultation that address the immediate and long-term needs of the society. **7.** Create a strong relationship with society in particular with industry to cooperate in the advancement of the country's economy. **8.** Continue to develop and maintain an adequate infrastructure. **9.** Increasing the training programs for faculty members. **10.** Enrollment of 13 faculty members in a Ph.D. programs inside Iraq. **11.** Enrollment of 2 faculty members in a Ph.D. programs outside Iraq. **12.** 5 faculty members will be enrolled in a Ph.D. program outside Iraq.

Institutional Support		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
- Complicated decision -making process at the College level. **a.** Complicated and restrictive purchasing procedures. **b.** Complicated & restrictive hiring procedures. - Insufficient funding for; Research; Teaching improvement; hiring adequate human resources. - Maintaining and upgrading facilities.	- Lack of self-care and unfaith, from some officials on the decision-making, especially with regard to factors associated with the development of the university, college, and the department.	**1.** Proposals to the MOHESR and the university to increase funding. **2.** Proposing Self - financing sources
Scientfic Research		
Weeknessess W	**Threats T**	**Actions Made & Proposed to be Made**
– The lack of a clear plan for scientific research reflects the requirements of the labor market. – The lack of appropriate financial allocations by the Ministry to support the achievement of rigorous scientific research. – The weakness of laboratory infrastructure and poor allocations earmarked for the purchase of modern laboratory equipment. – Lack of joint seminars between the department and public and private institutions which will reflect negatively on research trends. – The small number of joint research with professors from foreign universities. – Spread the misconception that individual is the best research from joint research, which indicates that faculty performance evaluation forms prepared by the ministry for the academic year 2010/2011, which gives weight to the individual research higher than the weight given to the Joint Research	– Because there is no strategy for scientific research, many problems remain in the labor market and new problems will appear unresolved due to lack of or poor coordination between academic institutions and the labor market. – Conduct research not directed correctly so that the go the efforts spent on such research so vain while it can be directed correctly in order to be fruitful research and applicable to solve realistic problems	Formation of joint committees between the research enterprise and the beneficiaries of research to develop plans for the implementation of research shall set solutions to problems engineering, and this is what we touch and see applied in practice through several research institutions worldwide to attract researchers and support their studies to benefit from their research they conduct according to a plan set by such institutions

CRITERION 1: STUDENTS

A. *Student Admissions*

An applicant for admission to an undergraduate program of (ME) at the Mech. Engr. Dept. / University of Baghdad must satisfy the following minimum requirements:

1. He / She should have an Iraqi secondary school certificate, or its equivalent, and majored in natural or technological sciences. The students must obtain a high rate qualifies for admission to engineering colleges.
2. Acceptance is centrally controlled by the Ministry of Higher Education and Scientific Research.
3. Distribution of students to the 12 engineering departments of the college of engineering, including the department of (ME), is made according to the capacity plan of the departments and the rating average of the applicants and their will. The capacity plan of the Department of in the last three years was 90 students. The number of students accepted is limited to the number of seats available as decided by the College Council based on the capacity of resources at the college.
4. Also included a plan to accept the top students from Technical Institutes Foundation, and the outstanding employees from state institutions and ministries.
5. The applicant must submit the required documents within a specified period.
6. An applicant who has graduated from a secondary school system outside Iraq must have completed twelve years of combined primary and secondary school studies from a recognized school. He is also required to provide an equivalency certificate from the Iraqi Ministry of Education.

Admission to (ME) is highly competitive. As explained above, applicants are granted admission in accordance with an overall evaluation on the basis of their rating record, but only to the extent permitted by the maximum number of new admissions established for that academic year.

A.1 *Enrollment*

Since 2006-2007, (ME) Program enrollment has ranged from 51 to 101. Table 1.1 shows the history of admissions standards of student enrollment trends over the past five years to (ME) baccalaureate programs.

Table (1.1): History of Admissions Standards for Past Five Years

Academic Year	Composite Score		Number of New Students Enrolled	Transfer Students	Number of Graduates
	Min.	Avg.			
2010-2011	88.71	89.13	63	22	63
2009-2010	87.57	87.991	62	13	45
2008-2009	88.00	88.4	51	14	79
2007-2008	92.28	92.7	62	N.A.	51
2006-2007	93.0	93.5	101	N.A.	74

Our data from the last five years tells us that approximately (20 %) of our undergraduate students enrolled from institutes. Approximately (4 %) transferred from other major engineering departments. Approximately, (35 %) of the enrolled students were transferred from the department.

B. *Evaluating Student Performance*

Student performance in each subject is evaluated by the faculty member, culminating with the assignment of a grade for that subject. The number and types of graded assignments vary according to what is most appropriate for the subject in question. These assignments are generally a combination of examinations, quizzes, homework, and/or laboratory reports. Projects and/or oral presentations are required for some subjects. Certain assignments are graded by a group of the faculty or instructors. For example, at the end of the senior year, the student presents a final written graduation project report. The student also gives an oral presentation of his / her project work, and answer questions on it.

B.1 *Educational Programs*

Credit Hour Definition

The department follows the university wide standard definition of a credit hour. (ME) program has the annual system of study which is followed for all subjects, that is; the number of hours which is assigned for each subject is the same for both the 1st and 2nd semesters without any difference between them. Excluding the final examination week, one semester credit hour represents one class hour per week with a stipulated duration of 50 minutes. Based on the definition of a 30-week per year, a typical three-credit hour class consists of 90 hours of contact hours.

B.2 *Participants and Graduation Trends*

Table 1.2 and Figure (1.2) shows participants and the percentage of success for each class over the past five years to (ME) baccalaureate programs.

Table (1.2): Participants and Graduation Trends

Academic Year	No. of Participants Students / Percentage of Success %							
	1st Year	2nd Year	3rd Year		4th Year		Participants	Total
			General Mech.	Aero. Engr.	General Mech.	Aero. Engr.		
2010-2011	42 /100 %	55/ 98.2%	40 / 100%	9 / 100%	49 / 90%	14 / 100%	211	208 / 98.1%
2009-2010	48 90.6 %	47 / 90.2%	52 / 98.1%	12 / 100%	36 / 97.3%	9 / 75%	218	204 / 93.6%
2008-2009	43 / 83%	55 / 77.8%	32 / 94%	11 / 71.4%	63 / 88.7%	17 / 94.1%	245	220 / 84.9%
2007-2008	53/84.1 %	44 / 91.7%	66 / 100%	17 / 94.4%	46 / 95.8%	5 / 100%	248	231 / 93.1%
2006-2007	43 / 86 %	88 / 96.6%	47 / 95.7%	5 / 100%	60 / 96.7%	14 / 100%	261	256 / 95%

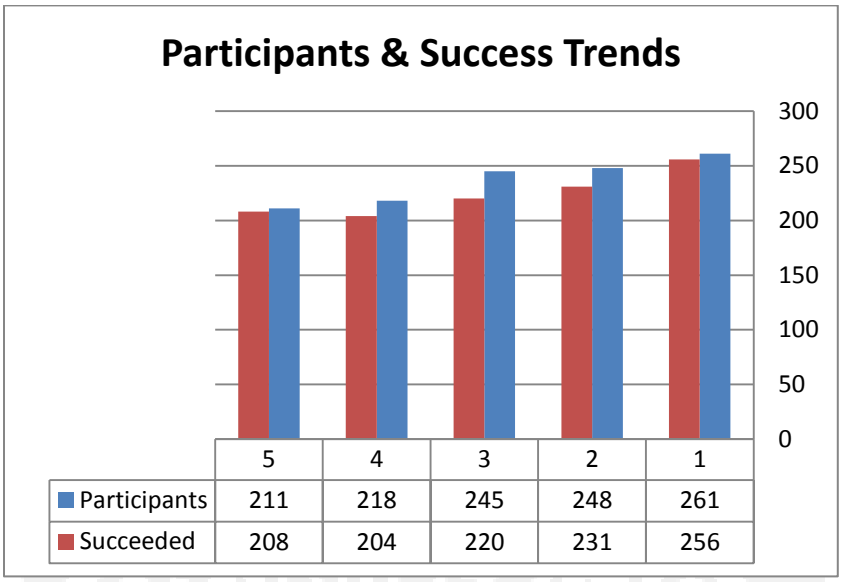


Figure (1.2): Participants and Success Trends

B.3 *Monitor the Progress of Students*

A student's progress is monitored by faculty advisors and the Registration Committee, they turn in final grades at the end of the academic year to the Examining Committee, and each student's transcript is checked to ensure that he / she remains in good academic standing. If the cumulative average is below 50%, the student is suspended. Grades are also forwarded to advisors, to assist them in monitoring student progress.

To enable the student to follow the curriculum and study vocabulary and assimilated well, he / she must abide by the attendance on a regular basis and not to repeat his absence to attend the lessons so as not to exceed the percentage specified (15% of the total number of hours during the year).

Even if that percentage of absences for legal reasons (e.g. sick leave), to follow up the students attendance correctly, instructors should distinguished and recording the absences on a regular basis in every lecture and deliver these absences at the end of the week to the registration committee, and then issue a preliminary and final warnings for bypassing or to issue orders of suspension for those who are over the rate (15%).

Table 1.3 shows the percentage of the Students Attendance for four stages (classes) for (ME) baccalaureate programs in the academic year (2010-2011).

Table (1.3): Students Attendance Rates

No. of Stage		Situation Of Students				
		Total Number	Postponed	Breakup	Transfer	Attendance Rates %
1st Year		42	12	4	22	90.6
2nd Year		56	3	2	-	88
3rd Year	General Mech.	40	1	2	-	90
	Aero. Engr.	9	-	-	-	90
4th Year	General Mech.	51	4	1	-	95
	Aero. Engr.	14	1	-	-	95

C. *Advising of Students*

Full-time faculty members in the Department of (ME) advise students who have selected mechanical engineering as their choice. This includes both pre-engineering students who have declared mechanical engineering as their major choice and those who are accepted in the (ME) Program. All new students are assigned to the program's undergraduate coordinator upon entering the program. During the middle of the first semester, they are assigned to various faculty members within the program. The assignment is random and based on balancing the workload among faculty members. Thus, a new student coming to the department will be assigned to the faculty members with the smallest number of advisers. This assignment is continued throughout the student's academic program to provide continuity and consistent advising for the student.

Table 1.4 shows the percentage of faculty members and their qualifications to the (211) number of students during the academic year (2010-2011).

Table (1.4): No. of Faculty Members / 211 Students for the Academic Year (2010-2011)

	Number of Faculty Member						Total
	Certification		Scientific Rank				
	Ph.D.	M.Sc.	Prof.	Asst. Prof.	Lect.	Asst. Lect.	
	30	36	6	16	25	19	66
% of (211) Students	14%	17%	3%	7%	12%	9%	31%

C.1 *Opinion of Students*

During the period of the academic year, the student is required to meet with a faculty members and to review his/her progress.

Input from all four stages students, data were collected during the academic year 2010-2011. The data show situation on the part of students regarding career, subjects, and professional advising by the program faculty. This form also provides feedback to the department about advising quality, an issue which merits close review. The advising process and survey will be modified as necessary and adapted for regular use. *See Criteria 4 for Assessment*.

D. Transfer Students and Transfer Subjects

Admission of transfer students is done centrally by the college through a committee chaired by the Assistant Dean for Student Affairs and worked according to laws and legislations made by the Ministry of Higher Education and Scientific Research MOHESR. The transfer students are subjected to a scientific cut-off for the subjects taken at their institutions or universities. The Scientific Committee of the Department converts the subjects from the other institutions to actual ME subject numbers and posts them to the student's ME transcript.

If there are any questions regarding the suitability of a substitution or transfer subject, the transfer committee contacts the department. The department reviews the syllabus, subject description and other material to determine whether the subject is equivalent to one in our curriculum. The answer is sent to the Office of the Assistant Dean for Student Affairs for approval and placement in the student's permanent file. Table 1.5 shows the number of transfer students enrolled in the department over the past three academic years.

Table (1.5): Transfer Students for Past Four Academic Years

Academic Year	Number of Transfer Students Enrolled
2010-2011	15
2009-2010	21
2008-2009	17

E. *Graduation Requirements*

The student performance is determined through the process of assignment of academic status. A student's academic status will be determined at the end of academic year and will appear on the transcript that shows his / her achievements throughout his / her undergraduate study. To become eligible for a Bachelor of Science degree in an engineering program, a student must fulfill the academic status which includes the following requirements:

1. Passing the four academic years successfully within the allowed study period (7 years).
2. Passing the summer training successfully.

The College Records Office, Graduation Records and Examination Committees of the department maintain a complete file on the academic program and progress of each student. This file contains all academic records and related correspondence and documents for the student, including the following:

- Transcript, updated at the completion of the senior year with 32 Subjects and 163 Units.
- Computer-generated degree audit sheet tailored to the mechanical engineering curriculum, which shows subjects completed in required categories and separate sections detailing math and science, humanities, engineering major, and other credits.
- Copies of all correspondence of an academic nature with the student, including letters of admission to the College of Engineering.
- Any exceptions to the rules filed by the student and any action taken on those exceptions.
- Any comments or instructions included by the student's faculty advisor, department chair, Engineering Records Office, or other pertinent source.
- Any supplementary information used in transcript evaluations of transfer credit.

Staff of the Department maintains all files and other pertinent records for the academic program. They also provide assistance in reviewing files to ensure that students are following their program and meeting any conditions of their enrollment, such as reduced hours for students on probation.

E.1 *Degree Check*

The department head meets with some graduating students to evaluate his / her academic record during the study period. "Degree Requirements Check sheet" worksheet (Figure 1.1) is used by the department to ensure that all graduation requirements have been met or will be met by the expected graduation date and Table 1.6 shows the Total Credits Required for Graduation**.** This evaluation also ensures that the ME program criteria are fulfilled.

Table (1.6): Total Credits Required for Graduation

Class		No. of Subjects	No. of Units	Number of Hours			
				Total	Th.	App.	Exp.
1st Year		7	39	26	16	3	7
2nd Year		9	43	30	18	5	7
3rd Year/General Mech.		8	40	28	17	5	6
3rd Year / Aero. Engr.		8	40	28	17	5	6
4th Year/General Mech.		8	41	29	17	5	7
4th Year / Aero. Engr.		8	41	30	17	6	7
TOTAL SUM	General Mech.	32	163	113	68	18	27
	Aero. Engr.	32	163	114	68	19	27

F. *Enrollment and Graduation Trends*

Table 1.7 and Figure (1.2) shows the enrollment trends for the last four academic years.

Table (1.7): Enrollment Trends for Past Four Academic Years

Academic Year	Full-time Students	No. of Graduates (B.Sc.)
2010-2011	211	63
2009-2010	218	45
2008-2009	245	79
2007-2008	248	51
2006-2007	261	74

Figure (1.7): Enrollment Trends for Past Four Academic Years

CRITERION 2: PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

A. *Vision and Mission Statements*

A.1 Vision

The Department of (ME) endeavours to be one of the leading mechanical departments in Iraq and the region.

A.2 Mission

1. Graduating highly qualified ethical mechanical engineers.
2. Building the leadership qualities in its graduates through teaching how to lead, problem solving, team work, quality considerations, and professionalism at work.
3. Instilling in graduates the spirit and commitment for acquiring knowledge and community service.
4. Contributing ideas of projects and carrying out research for the benefit and development of the community.
5. Nurturing and care of outstanding students and encouraging them to use their skills.
6. Student counselling, guidance and strengthening of citizenship spirit.
7. Providing good working environment for students, faculty, and other personnel with emphasis on high academic, professional and ethical standards within the university campus. Freedom of opinions and respect of others opinions and encouragement in exchanging knowledge.

   The above-mentioned mission statement of the (ME) Department is posted on the following web site of the College of Engineering at the University of Baghdad: **http://www.coeng.uobaghdad.edu.iq/**

B. *Program Educational Objectives (PEOs)*

Since its establishment, the Department of (ME) at the College of Engineering / University of Baghdad, worked hardly and continuously based on his noble mission in society service to achieve a number of strategical goals and objectives, the most important of them are;

1. Graduate mechanical engineers to serve in industry, construction and other sectors of the mechanical engineering labour market.
2. Improving the teaching and administrative activities to meet international accreditations standards and the mission of the department.
3. Improving the academic abilities of the faculty and attracting highly skilled personnel.
4. Improve the abilities of management and technical supporting staff and attract the highly skilled for employment.
5. Optimum use of resources and potentials of the department.
6. Cooperation, academic exchange programs, partnerships with other universities and academic centres in developed countries.
7. Establishing viable applied research that generates knowledge for local and foreign markets.

C. *Consistence of the Program Educational Objectives with the Mission of the Institution*

The (ME) Department PEOs are aligned well, closely linked to, and consistent with the department's mission. PEO 1 provides the first step towards a career of achievement and service. The needed background of knowledge and skills are acquired

to achieve PEO 1. Students acquire quality education through several avenues, including knowledge, skills and values as reflected in PEO 1. The professional and ethical issues are also preserved in PEO 1. PEOs 2, 3, 4 and 6 ensure the qualities for self-development and professional growth and improvement of the faculty and administrative and technical staff.

The Department PEOs are closely linked to, and consistent with, the University of Baghdad and College of Engineering missions. The University and College missions are directly served by the first, fifth and seventh (ME) Department PEOs.

D. *Program Constituencies*

The program constituents are those who must be *satisfied* with the performance of the (ME) program which are:

a. ***Faculty:*** Faculty members are involved on regular basis in the assessment processes. The faculty members are a congenial group who work as a team to improve ME education at Baghdad University. They are committed to the undergraduate program and producing graduates who will be active citizens and make a significant impact in the broad field of (ME). Many of the faculty members are currently engaged in their particular field of expertise outside of the University setting as consultants, and all faculty members are engaged with research.

b. ***Students:*** Current students are interested in whether the (ME) program adequately prepares them for future employment. The students in our program are motivated to become successful engineers.

c. ***Alumni:*** This group consists of recent graduates who have been employed for at most two years and graduates who have been employed for 3 to 5 years. Graduates with work experience of 3 to 5 years constitute a key part of the assessment process. They should have the incentives to assess the quality of PEOs based on their career achievements.

d. ***Employers***: (government, industry and universities): Employers' satisfaction with our students' education provides measure of the program success. Their satisfaction translates to employment opportunities for our students.

E. *Process for Establishing Program Educational Objectives*

PEO Definition

The PEOs were implemented in the ME program practically along its long history. The PEOs are drawn up in an engaging process involving constituents within the broader context of the institutional mission who are the department, the college and the University missions. The mission of the University, College, and department were to instill in its graduates a solid foundation of mathematical, scientific, and engineering knowledge in addition to developing the intellectual skills essential for excelling in their careers. The PEOs were discussed with all faculty members in several departmental meetings.

The PEOs of the ME Program aligned well with the Department's mission of providing the best quality education in (ME). ***Objective #1*** provides students with a solid foundation in the Mechanical Engineering discipline and design methodologies through emphasis on the application of mathematical, scientific, and engineering

principles. It provides the students with the knowledge of proper ethical and professional practices relevant to (ME), as well as awareness of the societal impact of mechanical engineering technologies. ***Objective #2*** focuses on the improvement, development and qualification of the teaching and administrative activities of the department. ***Objectives #3 & #4*** concentrate on the development and improvement of the faculty, engineering, technical, and administrative staff capabilities. ***Objectives #5*** considers the optimum use of the department facilities and resources, and improvement and qualification of these facilities. ***Objectives #6*** is related to the engagement and cooperation of the department with the highly qualified and developed universities and countries in order to improve and develop the ME Program of the department. ***Objectives #7,*** focuses on the scientific research activities of the department and how it can be directed towards the service of community, government and state.

PEOs Review

The PEOs review process consists of continuously demonstrating that the PEOs are based on the needs of the program's various constituencies. The review process of the (ME) department PEOs is conducted informally and continuously whenever possible. Assessing the extent to which the PEOs are achieved is an ongoing process through various assessment tools. The collected assessment data from the various sources will be compiled, analyzed, and corrective actions and / or refinements of the PEOs will be conducted as needed. Following is a list of the assessment tools that are used for this purpose:

Alumni survey, Employers survey, Faculty discussion, Students survey, Industry consultations.

F. *Achievement of Program Educational Objectives*

The Program Educational Objectives (PEOs) are rarely changed. They are difficult to assess from both time and cost point of views, as a complete assessment requires surveys of alumni and employers. Our process is to assess them continuously and informally whenever possible through many channels, such as employers and Alumni surveys, students' questioners process, faculty members' opinions, experts from industry opinions… etc. The main weakness of this assessment process is that it was not documented properly. Starting from the present academic year 2010-2011, a systematic documentation for a number of questioners was made, and samples of these questioners will be shown later, *See Criteria 4 for Assessment.*

CRITERION 3: PROGRAM OUTCOMES (POs)

A. *Process for Establishing and Revising Program Outcomes*

Establishing the Program Outcomes

The process of defining the PEOs and POs is made practically in the ME program along its long history during the informal and non-documented self assessment process undertaken by the Department. The broad objectives of the undergraduate program in ME Program were to instill in its graduates a solid foundation of mathematical, scientific, and engineering knowledge, in addition to developing the intellectual skills essential for prosperity and success in their careers. Once the Program Educational Objectives were derived based on input of all program constituents, POs were also determined to cover the PEOs, and in the same informal non-documented manner. After we have a review of the ABET POs, we believe that the department along its past history was indeed working to achieve the same outcomes.

Revising the Program Outcomes

As was mentioned previously in Criterion 2, the assessment process in the department is made informally and continuously through a number of tools, including: Alumni survey, Employers survey, Faculty discussion, Students survey, Industry consultations

B. *Program Outcomes*

Following a review of the ABET Criteria and the program objectives, it has been decided by the ME Department that the ABET Criteria (a - k) encompass the spirit of our educational vision. Therefore, outcomes (a - k) were adopted as the ME POs. The Department POs are:

a. An ability to apply knowledge of mathematics, science, and engineering.
b. An ability to design and conduct experiments, as well as to analyze and interpret data.
c. An ability to design a system, component, or process to meet desired needs.
d. An ability to function on multi-disciplinary teams (*Our interpretation of multidisciplinary teams includes teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds*).
e. An ability to identify, formulates, and solves engineering problems.
f. An understanding of professional and ethical responsibility.
g. An ability to communicate effectively.
h. The broad education necessary to understand the impact of engineering solutions in a global and societal context.
i. A recognition of the need for, and an ability to engage in life-long learning (*Our interpretation of this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability*).

j. Knowledge of contemporary issues (*Our interpretation of this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other support jobs as practiced by modern international companies*).
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

C. *Relationship of Program Outcomes to Program Educational Objectives*

The POs are closely linked to the PEOs. The relationship illustrating the POs serving each objective is mapped in Tables (3.1) and (3.2).

Table (3-1): Mapping Between POs and PEOs.

Program Educational Objectives	Program Outcomes
PO1. Graduate mechanical engineers to serve in industry, construction and other sectors of the mechanical engineering labour market.	a, b, c, d, e, f, g, h, i, j, k
PO2. Improving the teaching and administrative activities to meet international accreditations standards and the mission of the department.	b, c, e, k
PO3. Improving the academic abilities of the faculty and attracting highly skilled personnel.	a, b, c, d, h, j, k
PO4. Improve the abilities of management and technical supporting staff and attract the highly skilled for employment.	b, k
PO5. Optimum use of resources and potentials of the department.	a, b, c, k
PO6. Cooperation, academic exchange programs, partnerships with other universities and academic centres in developed countries.	d, f, h, i, j
PO7. Establishing viable applied research that generates knowledge for local and foreign markets.	d, h, i, j

Table (3-2): Matrix of POs to PEOs

PEOs	POs										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
PEO1	X	X	X	X	X	X	X	X	X	X	X
PEO2		X	X		X						X
PEO3	X	X	X	X				X		X	X
PEO4		X									X
PEO5	X	X	X								X
PEO6				X		X		X	X	X	
PEO7				X				X	X	X	

D. *Relationship of Courses in the Curriculum to the Program Outcomes*

To ensure that the outcomes of the ME Program will be achieved by students by the end of their program of study, it is necessary that such outcomes are injected and adequately covered throughout the program curriculum. The POs should be covered by the subjects in the program.

The learning outcomes of the subjects are mapped to the POs with a level of emphasis being Low (L), Medium (M), or High (H). The level of emphasis of a program outcome is determined by the weight used for assessing the outcome in each subject. The level of emphasis for an outcome is determined by the weight as follows:

- When the subject outcome weight is < 10%, it will be given a Low rank (L).
- When the subject outcome weight is between 10% and 20% it will be given a Medium rank (M).
- When the subject outcome weight is > 20% it will be given a High rank (H).

Table (3.3) shows the mapping between the Course Outcomes of ME Program subjects and POs. The POs are covered in an overlapping manner over the subjects of the program curriculum. Design capabilities are adequately covered by several subjects.

The ability to apply knowledge of math, science and engineering to solve engineering problems are also well addressed in several subjects. Teamwork is encouraged in all subjects with lab work or project. The ability to design and conduct experiments is covered in subjects involving lab work. The use of engineering tools is also emphasized in all subjects with lab work or course projects. Students are also trained on self-learning abilities in several subjects. Communication skills are emphasized in all subjects with a project in addition to the summer training. Some subjects help in enhancing the student's oral presentation skills. The impact of engineering solutions on global and societal context is addressed in the senior design project. A detailed description of the subjects' syllabi and associated subject outcomes is given in Appendix A.

Table (3.3): Required Subjects and Their Emphasis on POs

Outcome		a	b	c	d	e	f	g	h	i	j	k
Subject No.	Subject Name											
ME101	Mathematics / I	H										
ME102	Engineering Mechanics	H		M		H			H	M		
ME103	Engineering Drawing and Descriptive Geometry								H	M		
ME104	Principles of Production Engineering	H	H	H	H	M				M		M
ME105	Electrical Engineering / I	H	H			H				M		M
ME106	Programming / I				H			M	H	M		
ME107	Human Rights										M	
ME201	Mathematics / II	H										
ME202	Fluid Mechanics / I	H	M	H	M	H	M	L	H	M		

ME203	Thermodynamics	H	M	H	M	H	M	L	H	M		
ME204	Mechanics of Materials and Machines	H	M	H	M	H	M	L	H	M		
ME205	Engineering of Metallurgy	M	M		M		M	L	M	M		
ME206	Mechanical Drawing			M	M	L		H	M	M		
ME207	Programming / II				M			M		M		M
ME208	Freedom and Democracy										M	
ME209	Mechanical Engineering Laboratories / II	H	H	H	H			M				H
ME301	Engineering and Numerical Analysis	H			M			M		M		M
ME302	Fluid Mechanics / II	H	M	H	M	H	M	L	H	M		
ME303	Heat Transfer	H	M	H	M	H	M	L	H	M		
ME304	Strength of Materials	H	M	H	M	H	M	L	H	M		
ME305	Mechanics of Machines and Vibrations	H	M	H	M	H	M	L	H	M		
ME306	Principles of Manufacturing Processes	H	H	H	H	M				M		M
ME307	Electrical Engineering / II	H	H			H				M		M
ME308	Mechanical Engineering Laboratories / III	H	H	H	H			M				H
ME309	Introduction to to Aeronautical Science	H	M	H	M	H	M	L	H	M		
ME310	Aircraft Structure	H	M	H	M	H	M	L	H	M		
ME311	Manufacturing Processes and Engineering Materials for Aircraf	H	H	H	H	M				M		M
ME401	Design of Machine Elements	H	M	H	H	H	M	M	H	M		
ME402	Control and Measurements	H	M	H	M	H	M	L	H	M		
ME403	Air-Conditioning and Refrigeration	H	M	H	M	H	M	L	H	M		
ME404	Power Engineering	H	M	H	M	H	M	L	H	M		
ME405	Industrial Engineering	M	M		M	M	M	L	H	M		
ME406	Engineering Materials	M	M		M		M	L	M	M		
ME407	Engineering Project	H	H	H	H	H	H	H	H	H	H	H
ME408	Mechanical Engineering Laboratories / IV	H	H	H	H			M				H
ME409	Aerodynamics	H	M	H	M	H	M	L	H	M		
ME410	Jet Engines	H	M	H	M	H	M	L	H	M		
ME411	Aircrafts Performance and Systems	H	M	H	M	H	M	L	H	M		

***E*. Learing Outcomes:** Skills acquired by students and methods of measurement. Table (3.4)

Table (3-4) Skills Acquired by the Students and Methods of Measurement

Acquired Skills	Lessons through which Skills Acquired	Method of Assessing the Skills
a. An ability to apply knowledge of mathematics, science, and engineering.		
• Use mathematics to solve engineering problems • Applied mathematics and engineering science in engineering matters, evaluation, planning, engineering design	ME202, ME203, ME204, ME302, ME303, ME304, ME305, ME306, ME309, ME310, ME311, ME401, ME402, ME403, ME404	Homworks & Assignements Quizes Lab. Experiments Examinations
b. An ability to design and conduct experiments, as well as to analyze and interpret data.		
• Design and conduct experiments to verify the presence of engineering problem • Conduct experiments with different scales to obtain data Simulated reality • Use of appropriate methods of analysis of the data collected and provide an explanation of the results	ME103, ME105, ME206, ME209, ME301, ME308, ME405, ME408	Lab. Experiments Projects Writing Reports Examinations & Quizes Extracurricular activities
c. An 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.		
• Determine the design requirements • Explain the selection of design parameters • Determine the possibility of multiple solutions for one design and demonstrate best choice for design • Clarify the functions of the final design to meet the requirements	ME206, ME304, ME305, ME307, ME310, ME401, ME402, ME404, ME407,ME411	Homworks Reports Graduation Projects Examinations Quizes Extracurricular activities
d. An ability to function on multidisciplinary teams.		
• Learn basic concepts related to collective action, such as leadership, cooperation, objectives, and results • Knowledge of basic concepts related to team disputes such as differences in attitudes, personal goals, dependency and lack of participation. • Learn basic concepts related to the management team such as managing effective meetings, listening skills and positive communication, setting goals, and assess the level of progress • Clarify the ability to organize and good management of the project team with different specialties	ME207, ME308, ME407, ME408	Reports Graduation Projects Extracurricular activities

e. An ability to identify, formulates, and solves engineering problems.		
• The ability to identify issues that can be resolved through engineering concepts and models. • The ability to develop standards and specifications with solutions identify the determinants of issues • The successful application of engineering techniques to solve engineering problems	ME102. ME103, ME105, ME202,ME203, ME204, ME206, ME303, ME304, ME305, ME307, ME310, ME311, ME401, ME402, ME403, ME404, ME405, ME409, ME410, ME411	Homworks Quizes Examination
f. An understanding of professional and ethical responsibility.		
• Understanding engineering profession and responsibility • Knowledge engineering responsibility in terms of risk assessment and safety, honesty and reliability, loyalty and opposition in the workplace	ME103, ME106, ME206, ME207, ME310, ME401, ME402, ME403, ME404, ME405, ME410	Meetings and direct dialogues between students and faculty
g. An ability to communicate effectively.		
• Possess technical writing skills • Possession oral skills that make it able to effectively communicate his knowledge of technical information about the planning and engineering design • The ability to communicate complex ideas or engineering designs for people from outside	ME107, ME208, ME407	Reports discussions Graduation Projects Extracurricular activities
h. The broad education necessary to understand the impact of engineering solutions in a global & societal context.		
• Application of knowledge and engineering skills needed to deal with engineering issues and their impact on the cultural and ethical factors • Understand the positive and negative effects of the engineering and technology on society and how these effects associated with economic reality and political	ME104, ME206, ME304, ME305, ME310, ME401, ME405	Meetings and direct dialogues between students and faculty
i. A recognition of the need for, and an ability to engage in life-long learning		
• Take advantage of the learning opportunities outside the formal classroom activities by attending professional lectures, seminars, and training courses • Approximate limits apply theory to practice site	ME103, ME206, ME405	Meetings and direct dialogues between students and faculty
j. Knowledge of contemporary issues		
• Identify and describe the challenges faced by engineers today • Clarify important trends and issues in the field • Determine the potential applications of knowledge engineering in the design and analysis of contemporary engineering operations	ME407	Meetings and direct dialogues between students and faculty discussions Graduation Projects
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.		
• The ability to use modern methods of analysis and design in modern engineering applications • The ability to use equipment correctly • The ability to use computer programs in engineering applications	ME105, ME106, ME207, ME307	Lab. Experiments Homworks Quizes Examinations

F. *Documentation*

Starting from the academic year 2010-2011, the department starts for the first time the process of making subjects portfolio, which are designed to include the documentation for the entire program outcomes for all ME subjects. The following documents are planned to be accessible to the visitors for review.

i. Subjects portfolios for some of ME subjects.
ii. Department of Mechanical Engineering Guide.
iii. College of Engineering Catalog.
iv. Minutes of some Committees meetings of ME Departmental.
v. The portfolio for a certain subject includes, in it, all the necessary information, pertinent to that particular subject. These are;

a. Subject contribution to the program outcome.
b. Subject assessment reports.
c. Faculty/ Subject self-assessment reports.
d. Detailed subject syllabus.
e. Subject objectives.
f. Subject Learning Outcomes.
g. Student Grade Distribution.
h. Subject student evaluation.
i. Three samples of students graded work (tests, final exam, quizzes, and assignments.
j. Original copy of tests, exam, quizzes, and assignments.
k. Lab sheets and sample of Lab reports.
l. Lab Manual.
m. Samples of term project reports.

It should be noted here that all of the contents of each subject portfolio have to be updated each year.

CRITERION 4: CONTINUOUS IMPROVEMENT

Introduction

The Mech. Engr. Dept. at Baghdad University offers program leading to a bachelors of Science degree in ME. A comprehensive assessment program to evaluate the program objectives and the student outcomes to improve the program on a continuous basis has been initiated. This document outlines the procedure with which the outcomes and objectives are assessed and the results are evaluated and then benchmarked against targeted goals and how the curriculum and/or program requirements are changed to meet these goals. The continuous improvement process is based upon the assessment, evaluation and comparison to targeted levels of performance and then feedback to changes in the curriculum. The program objectives and student outcomes are defined to be in compliance with the (ABET).

A. Review of Program Outcomes and Student Objectives

The program outcomes will be periodically reviewed (every other year) with the faculty and the related committees in the department. To support the program, the MED has made questioners to (17) different state offices, factories, companies and also private sector companies asking them about their opinions in the department graduates and their suggestions to improve the program. The assessments are analyzed by the faculty to determine if changes are needed. The results of the questioners are shown in Figure (4.1).

University of Baghdad / College of Engineering

Mechanical Engineering Department

Work Institutions Opinion Questionnaire About Graduates of

Baghdad UniversityAcademic Year 2010 - 2011

Year of Graduation: ***College:*** ***Department:***

Specialization: ***Date of Appointment:*** ***Mail:*** ☐ ***Female:*** ☐

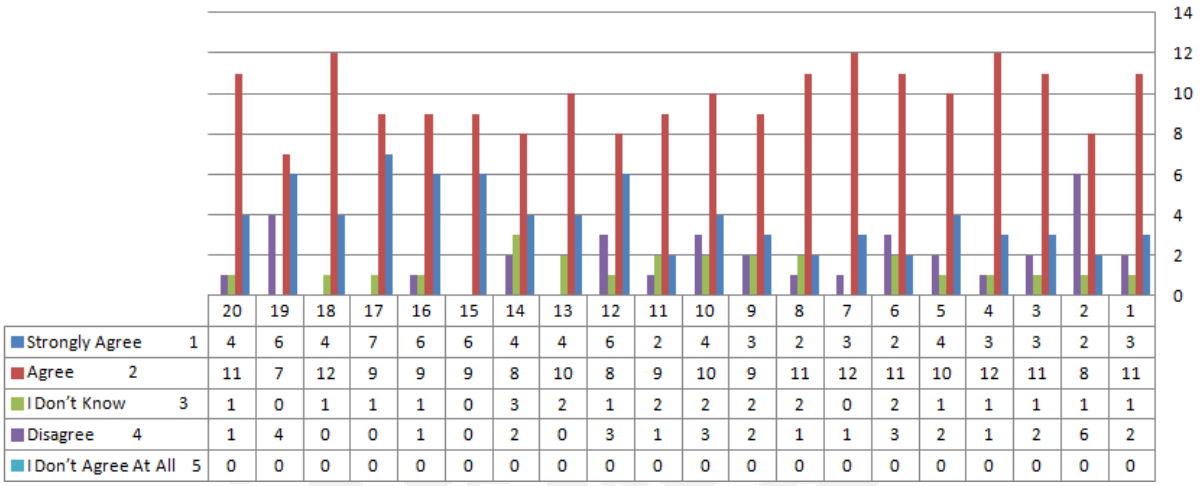
Ministry \ Institution That Employs Graduate: ***Department\section:***

Work Position: ***Governmental*** ☐ ***Individual*** ☐

No. of years of service to graduate in his place:

The interest in the performance of graduates in the job in the institutions in which they work is very useful in the development of the quality of scientific programs and training for all disciplines in the universities. The feedback to the colleges and departments to help supplement the institutions in the public and private sectors with graduates that are highly qualified in the functional performance of their duties. So please provide us with information through the specimen to answer the following questions by putting (√) in the place which reflects the performance of graduates taking into account the accuracy and objectivity in the public interest ... Appreciate your cooperation.

	Question	Strongly Agree 1	Agree 2	I Don't Know 3	Disagree 4	I Don't Agree At All 5
1	Has sufficient knowledge and information related to employment issues	3	11	1	2	-
2	Has sufficient skills related to employment issues	2	8	1	6	-
3	Possesses the skills of social communication with customers	3	11	1	2	-
4	Have written communication skills (writing the required reports are properly)	3	12	1	1	-
5	Possesses the skills of research and analysis in the affairs of the workListen	4	10	1	2	-
6	Possess critical thinking skills and the ability to solve problemsListen	3	11	-	3	-
7	Possesses the skills of teamwork	6	9	1	1	-
8	Has the skills to work within the team	4	8	2	3	-
9	Possesses the skills of planning and organization for work	4	10	3	-	-
10	Has the ability of high productivity at work	6	9	-	2	-
11	Has the quality of work performance piece	7	8	2	-	-
12	Has the capacity to creativity, innovation and work development	6	9	1	1	-
13	Has the ability to comply with the various conditions of the work	7	9	1	-	-
14	Has the ability to take responsibility	4	12	1	-	-
15	Possesses the skills of social interaction with colleagues	6	7	-	4	-
16	Has the ability to accept guidance and ready for implementation	4	11	1	1	-
17	Has a sense of the importance of work performed by	7	9	1	-	-
18	Has the ability to audit and review the work assigned to him	4	12	1	-	-
19	Has the ability to deal with the problems and difficulties of working with	6	7	-	4	-
20	Has the capacity to follow up on any up-dates in the field of workListen	4	11	1	1	-



	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Strongly Agree 1	4	6	4	7	6	6	4	4	6	2	4	3	2	3	2	4	3	3	2	3
Agree 2	11	7	12	9	9	9	8	10	8	9	10	9	11	12	11	10	12	11	8	11
I Don't Know 3	1	0	1	1	1	0	3	2	1	2	2	2	2	0	2	1	1	1	1	1
Disagree 4	1	4	0	0	1	0	2	0	3	1	3	2	1	1	3	2	1	2	6	2
I Don't Agree At All 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure (4.1): Opinion Questionnaire About Graduates

B. Program Outcome Assessment Techniques

- Survey of Alumni will be implemented every five years starting with the 2007–2008 academic year alumni survey. ***See Criteria 2: PEOs and Criteria 3 POs.***
- The related committees in the department; such as scientific-, QA-, student affairs-, cooperation mechanism- committee.
- Employment trends of our graduates will be tracked, e.g. place of employment and job title, every year.

- Survey of Employers of Graduates will be given at least every other year to determine if the PEOs are still relevant to the employers of our graduates.
- The POs themselves will be re-evaluated every few years first by the faculty and then with the Council Presidency Department. Informal review of the POs will occur in conversations with alumni.

Table (4.1) Summary of Assessment and its Link to Program Educational Objectives (PEO)

Assessment Technique	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7	
Survey of Alumni	X	X	X	X	X	X	X	Every 5 years
Department Committees	X	X	X	X	X	X	X	annually
Employment Trends	X							annually
Employer Survey	X	X	X	X	X	X	X	biannual

C. Summary of Student Outcomes Assessment Techniques

- Alumni survey as described above but a portion that addresses the student outcomes.
- Co-op Employer evaluation data is obtained at the end of the student co-op experience from co-op employer surveys regarding student performance.
- Student Co-op evaluation data is obtained from students at the end of their co-op experience regarding the students' perception of their performance.
- Senior Exit Survey are given every year in the senior design capstone class to determine how well students feel they have achieved the student outcomes.
- Summary of student performance is gathered in the form of final grades of the ME courses.
- Evaluation of student data, specifically of transcripts for each graduate, is analyzed for time to graduation and retention rate as well as performance in ME courses.
- Embedded assessment is performed in every class, every year. Not all student outcomes are evaluated in every single class but a representative sample is chosen. This will be accomplished by assess student assignments, quizzes, exams, lab reports, projects and presentations.

D. Responsibilities of Assessment, Evaluation, and Continuous Improvement Process

Faculty who teach the ME courses are responsible for writing the rubrics for embedded assessment and for determining level of acceptable performance. These faculties are responsible for keeping track of the assessment and for offering changes to the program, if needed based upon the results of assessment.

The MED related Committees have been formed to perform a yearly internal audit of the continuous improvement process. These committees are currently made up of the ME faculty who will meet after the summer vacation each academic year. Action plans resulting from this annual meeting will be presented depending upon the action plan. The committees are responsible for communicating the results of the assessment (when appropriate) with ME faculty, with the Department Head, and with students. The MED determined that a standardized advising process needed to be developed and posted to make students aware of the correct procedures for being advised, this proposal process is shown in Figure (4.2) for the students opinion about curriculum and in Figure (4.3) for the students opinion about faculty. The faculty meets and discusses with the students about the long-term strategy of his/her curriculum.

University of Baghdad/College of Engineering/Mechanical Engineering Department

Students Opinion Questionnaire about Curriculum

Academic Year 2010 – 2011

Code No. & Curriculum Name: **: ME 202 FLUID MECHANICS / I** ***Year:*** **2nd Year**

Faculty Member's Name: **Prof. Dr. Ihsan Y. Hussain**

Dear Students: For the development of the educational process at the university, we hope to express your opinion by answering accurately with mark √ in the place which reflects your opinion taking into consideration the accuracy and objectivity.

	Question	Strongly Agree 1	Agree 2	I Don't Know 3	Disagree 4	I Don't Agree At All 5
1	Overall, this Curriculum subject is good and useful	9	7			
2	Lecture time is sufficient to cover the contents of the article	7	6		3	
3	The content of article commensurate with the objective of Curriculum	6	9	1		
4	Subject content is an interdependent information	5	7	1	3	
5	Textbooks and references are available and meaningful	3	7	1	5	
6	available of References helpful for stimulate and thinking	2	8	2	1	3
7	The book is free of grammatical errors Printing	3	6	5	2	
8	Contents of the book are of outdated information	2	6	7		1
9	The book contains a variety of examples and exercises	7	7	1	1	
10	The evaluation of the subject system is appropriate (test method)	6	7	1		2
11	Exams reflect the content of the subject	6	6	1	3	
12	Number of exams be exhaustive of the content subject	6	8	2		
13	Examinations and assignments helped to absorb the subject	5	8			3
14	Examinations and exercises are in line with the objectives of the subject	5	8	1	2	
15	Examinations and exercises help to think of more conservation	5	9		2	
16	Number of exams and the their recurrence are appropriate	6	6	2	1	1
17	The case of equipped lecture halls satisfactory	2	3		5	6
18	Capabilities and laboratories are appropriate and effective	1		1	6	8

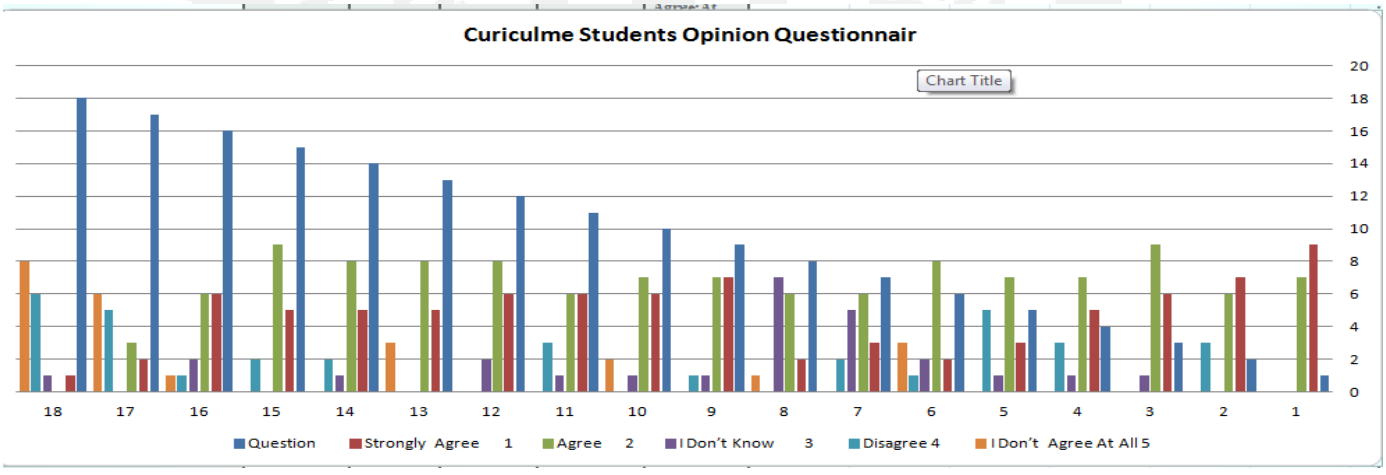


Figure (4.2): Curriculum students' opinion about

University of Baghdad / College of Engineering / Mechanical Engineering Department

Students Opinion Questionnaire about Faculty Member

Academic Year 2010 – 2011

Code No. & Curriculum Name*:** **ME 202 - FLUID MECHANICS (1)** ***Year: **2nd Year**

Faculty Member's Name: **Dr. Ihsan Y. Hussain**

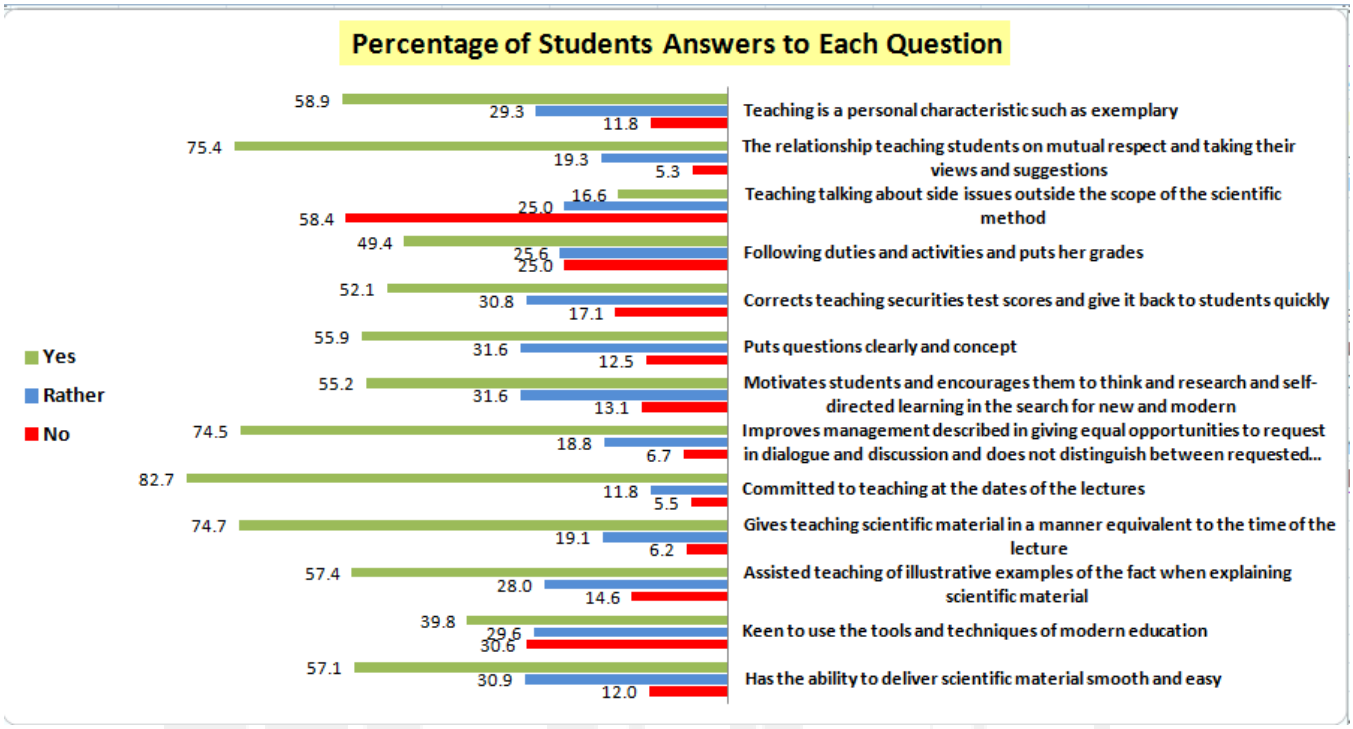
Is the plan of teaching the subject was distributed from the beginning of the year? Yes [13] No [ ] I don't know [3]

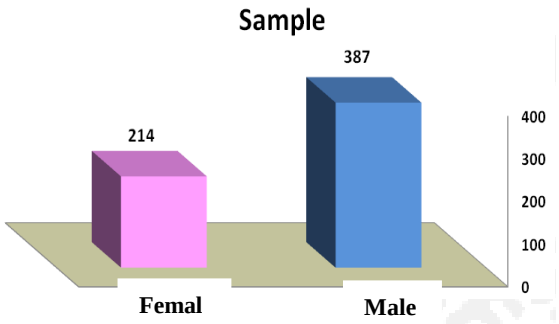
Is the faculty member is committed to the specific office hours of the subject? Yes [12] No [1] I don't know [3]

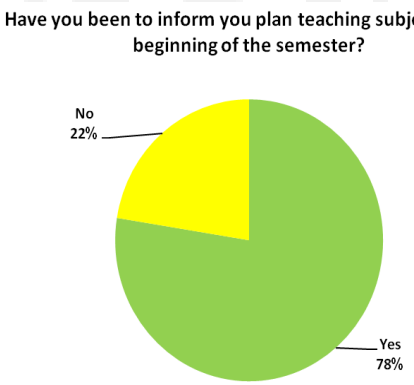
If the answer is (No) explained that_____

Dear Students: For the development of the educational process at the university we hope to express your opinion by answering accurately with mark √ in the place which reflects your opinion taking into consideration the accuracy and objectivity.

No.	Question	Strongly Agree	Agree	I Don't Know	Disagree	I Don't Agree At All
1	Has the ability to communicate scientific material in a smooth and easy manner	2	10	-	2	2
2	Keep to use the tools and techniques of modern education	2	5	-	7	2
3	Illustrates the theoretical aspects in the subject with examples from the reality	2	6	4	2	2
4	Gives the scientific material in a manner covering the time of the lecture	3	12	-		1
5	Committed to the dates of lectures	4	11		1	
6	Improve in the management ranks and give equal opportunities to students in dialogue and discussion	4	8	2	1	1
7	Motivates students and encourages them to think and research	3	8	2	1	2
8	Respects the different views of the students	3	9	1	1	2
9	Through self-learning encourages students to search for what is new & modern	3	7		5	1
10	Accept criticism and suggestions with an open mind	4	6	2	2	2
11	Be objective and fair in his / her evaluation of students	3	10	1	1	1
12	Uses a variety of methods to assess the performance of students (such as reports, research, and quizzes),	2	12	-	1	1
13	Follow up activities and duties to put the evaluation weights	2	10	1	3	-
14	Has the ability to discuss all issues of the subject	2	8	2	2	2
15	Working to increase the knowledge of the outcome requested	2	8		5	1







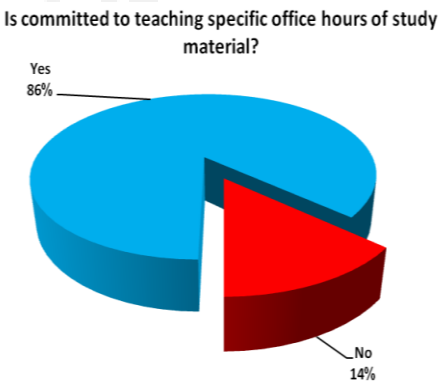


Figure (4.3): Faculty students' opinion

E. Data Collection and Analysis

1. **Direct assessment data**

- Will be collected during the academic year and analyzed during May of each academic year.
- Analysis will be discussed by faculty involved in teaching ME courses for suggested action.
- Department head will be sought the inputs after the initial analysis of data by faculty, depending upon the level of action.

2. **Indirect assessment data**

- Will be collected on a proposed timescale.
- The analysis will be performed by the related committees.
- Analysis will be discussed with the faculty, the Department Head, and depending upon the situation, students, and suggested action will be solicited and implemented.

Actions to Improve the Program

Continuous improvement is a focus of our department and is done every day as a natural part of our profession. We strive always to improve processes that are weak and fix processes that are broken. We have not set "degrees of attainment" goals for each of the outcomes. We attempt to work on every deficit we uncover in our efforts to achieve outcomes. We expect every instructor to continuously improve performance of students in his / her subjects, whether they are currently at low or high level. We practice continuous improvement not because of quality assurance, but because we want our program to be "optimal" given the constraints that we have, analogous to any optimization problem that ME might try to solve. The following specific actions have either been successfully implemented or are in process.

1. Comprehensive changes in curriculum in the academic year 2008-2009.
2. Continuous improvement of faculty through training programs.
3. Promoting a number of faculty members to higher scientific ranks.
4. Purchasing a number of laboratory equipment and measuring instruments.
5. Purchasing a number of books for the library of the department.
6. Purchasing a number of computers.
7. Establishment of network access facilities provided by the Computer Center of Baghdad University in the form of a Wireless LAN network with 10 terminals available now in the department.
8. Employment a number of faculty, engineering and technical staff.
9. Increase in extra-curricular activities for students such as setting up scientific conferences and seminars.
10. Reconstruction and rehabilitation of classrooms and rooms in the department, as well as services and infrastructure.

F. Dissemination

After any action has been taken, the action will be assessed with the most appropriate assessment tools listed above and a review of the action will be discussed with faculty, the Department Head and with students.

- Changes that are approved by the Input Process will be added to the University Catalog, which will be the source of information for all other publications and websites in the near future.
- Students – the websites that describe the curriculum and program will be updated with any and all actions that take place. Emails will be sent to all ME students with the changes to the curriculum along with a discussion of how the changes impact current students.
- Faculty – will be informed of assessment results and subsequent changes via faculty meetings, emails, and written memos.
- Alumni – will be informed of changes to the program objectives and the program itself via email and phone calls.

CRITERION 5: CURRICULUM

A. *Program Curriculum*

The Bachelor of Science (B.Sc.) in ME conferred by the department includes two branches, General Mechanics and Aeronautical Engineering, and the student can choose one of these specialties starting from the third year of study. A lot of curriculums are shared between the two branches, and specialization of the Aeronautical Engineering is made in the third and fourth years in specialized subjects taught to the student.

A.1 *Mechanical Engineering Program: Curriculum*

Adequate time and attention is given to design the subject objectives of each curriculum component such that it meets the program objectives and outcomes. This adequacy is evident from the curriculum syllabi as demonstrated in Appendix A. Typical degree program is shown in Tables (5.1.a) and (5.1.b) for General Mechanics and Aeronautical Engineering, respectively. The mechanical engineering curriculum provides a good balance between mathematics and basic sciences, mechanical engineering subjects, and general education subjects.

The ME Program prepares students for engineering practice through the whole 4-year curriculum. Ideally, a better approach would have been to first design the objectives and outcomes of the program, and then design the curriculum based on that information.

Table (5.1.a): B.Sc. Degree Curriculum \ General Mechanics Engineering

1st Yr.	Subject	Unit	2nd Yr.	Subject	Units
ME101	Mathematics / I	**6**	ME201	Mathematics / II	**6**
ME102	Eng. Mechanics	**8**	ME202	Fluid Mechanics / I	**6**
ME103	Eng. Drawing and Descriptive Geometry	**7**	ME203	Thermodynamics	**4**
ME104	Principles of Production Eng.	**6**	ME204	Mechanics of Materials and Machines	**6**
ME105	Electrical Eng. / I	**5**	ME205	Eng. of Metallurgy	**4**
ME106	Programming / I	**5**	ME206	Mechanical Drawing	**4**
ME107	Human Rights	**2**	ME207	Programming / II	**8**
			ME208	Freedom and Democracy	**2**
			ME209	Mechanical Eng. Laboratories / II	**3**
/	**TOTAL SUM**	**39**	/	**TOTAL SUM**	**43**
3rd Yr.	**Subject**	**Unit**	**4th Yr.**	**Subject**	**Unit**
ME301	Eng. and Numerical Analysis	**7**	ME401	Design of Machine Elements	**9**
ME302	Fluid Mechanics / II	**6**	ME402	Control and Measurements	**4**
ME303	Heat Transfer	**4**	ME403	Air-Conditioning and Refrigeration	**6**
ME304	Strength of Materials	**4**	ME404	Power Eng.	**6**
ME305	Mechanics of Machines and Vibrations	**4**	ME405	Industrial Eng.	**4**
ME306	Principles of Manufacturing Processes	**7**	ME406	Engineering Materials	**4**
ME307	Electrical Engineering / II	**5**	ME407	Engineering Project	**5**
ME308	Mechanical Eng. Laboratories / III	**3**	ME408	Mechanical Eng. Laboratories / IV	**3**
/	**TOTAL SUM**	**40**	/	**TOTAL SUM**	**41**

Table (5.1.b): B.Sc. Degree Curriculum \ Aeronautical Engineering

3rd Yr. \Aero	Subject	Unit	4th Yr.\Aero	Subject	Unit
ME301	Eng. and Numerical Analysis	**7**	ME401	Design of Machine Elements	**9**
ME303	Heat Transfer	**4**	ME402	Control and Measurements	**4**
ME305	Mechanics of Machines and Vibrations	**4**	ME403	Air-Conditioning and Refrigeration	**6**
ME307	Electrical Engineering / II	**5**	ME407	Engineering Project	**5**
ME308	Mechanical Eng. Laboratories / III	**3**	ME408	Mechanical Eng. Laboratories / IV	**3**
ME309	Introduction to Aeronautical Science	**6**	ME409	Aerodynamics	**4**
ME310	Aircraft Structure	**4**	ME410	Jet Engines	**4**
ME311	Manufacturing Processes and Engineering Materials for Aircrafts	**7**	ME411	Aircrafts Performance and Systems	**6**
/	**TOTAL SUM**	**40**	/	**TOTAL SUM**	**41**

Our program's credit hours and curricular components distribution are summarized in Table (5.2).

Table (5.2): General Mechanics & Aeronautical Eng. Curriculum \ Credit Requirements

- **4 - Years Program (Full - Time Study)**
- **113 & 114 subject credit hours for the General Mech. & Aero. Eng., respectively**
- **Curriculum Component**
  - O **Mathematics and basic Science: 13 hrs. for each of the General Mech. & Aero Eng.**
  - O **Engineering Topics: 74 & 75 hrs. for the General Mech. & Aero Eng. respectively**
  - O **General Education: 26 hrs. for each of the General Mech. & Aero Eng.**

B. *Credit Hour Distribution*

Tables (5.3.a) & (5.3.b) show the General Mechanics & Aeronautical Engineering Program Curriculum. For each curricular area specifically addressed by either the general criteria or the program criteria as shown in tables, describe how the program meets the specific requirements in terms of hours and depth of study. The tables also indicate the subjects that contain significant design component. Figure 5.1 illustrates the general relative distribution of each category.

Table (5.3.a): Plan of study for Baccalaureate Degree \ General Mechanics

Year	Code No.	Subject	*Curricular Area (Credit Hours)*		
			Math. /Basic Sciences	**Engineering Topics**	**General Education**
1st	ME101	Mathematics / I	4		
	ME102	Eng. Mechanics		5	
	ME103	Eng. Drawing and Descriptive Geometry			5
	ME104	Principles of Production Eng.		4	
	ME105	Electrical Eng. / I			3
	ME106	Programming / I			3
	ME107	Human Rights			2
2nd	ME201	Mathematics / II	4		
	ME202	Fluid Mechanics / I		4	
	ME203	Thermodynamics		3	
	ME204	Mechanics of Materials and Machines		4	
	ME205	Eng. of Metallurgy		2	
	ME206	Mechanical Drawing			3
	ME207	Programming / II			5
	ME208	Freedom and Democracy			2
	ME209	Mechanical Eng. Laboratories / II		3	
3rd	ME301	Eng. and Numerical Analysis	5		
	ME302	Fluid Mechanics / II		4	
	ME303	Heat Transfer		3	
	ME304	Strength of Materials		3	
	ME305	Mechanics of Machines and Vibrations		3	
	ME306	Principles of Manufacturing Processes		4	
	ME307	Electrical Engineering / II			3
	ME308	Mechanical Eng. Laboratories / III		3	
4th	ME401	Design of Machine Elements		6	
	ME402	Control and Measurements		3	
	ME403	Air-Conditioning and Refrigeration		4	
	ME404	Power Eng.		4	
	ME405	Industrial Eng.		3	
	ME406	Engineering Materials		2	
	ME407	Engineering Project		4	
	ME408	Mechanical Eng. Laboratories / IV		3	
Total			13	74	26
% of Total			11.5 %	65.5 %	23 %

Table (5.3.b): Plan of study for Baccalaureate Degree \ Aeronautical Engineering

Year	Code No.	Subject	*Curricular Area (Credit Hours)*		
			Math./Basic Sciences	Eng.Topics	General Education
3rd Aero	ME301	Eng. and Numerical Analysis	5		
	ME303	Heat Transfer		3	
	ME305	Mechanics of Machines and Vibrations		3	
	ME307	Electrical Engineering / II			3
	ME308	Mechanical Eng. Laboratories / III		3	
	ME309	Introduction to Aeronautical Science		4	
	ME310	Aircraft Structure		3	
	ME311	Manufacturing Processes and Engineering Materials for Aircrafts		4	
4th Aero	ME401	Design of Machine Elements		6	
	ME402	Control and Measurements		3	
	ME403	Air-Conditioning and Refrigeration		4	
	ME407	Engineering Project		4	
	ME408	Mechanical Eng. Laboratories / IV		3	
	ME409	Aerodynamics		3	
	ME410	Jet Engines		3	
	ME411	Aircrafts Performance and Systems		4	
Total			13	75	26
% of Total			11.5 %	65.5 %	23 %

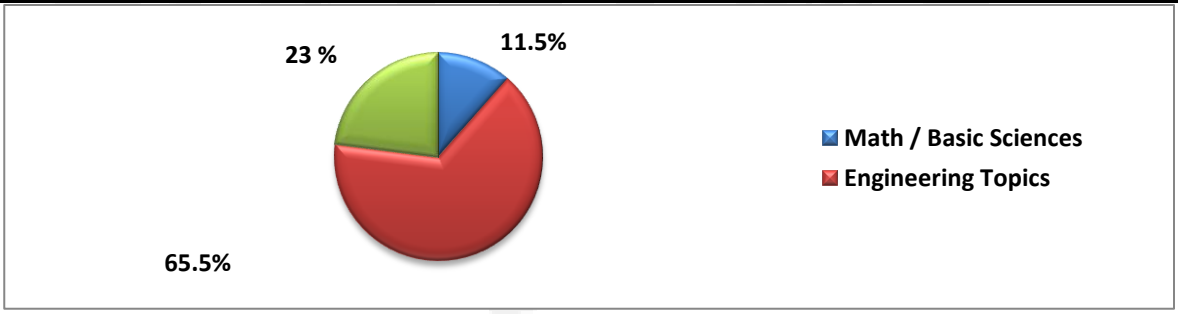


Figure (5.1): General Relative Distributions of Curriculum Categories

C. ***Requirements for Bachelor of Science in Mechanical Engineering***

The following subsections describe the program areas: (1) Mathematics, (2) General Education includes Technical engineering component (non-mechanical) and non technical component including social and humanity component. (3) Topics of Core Engineering

ME program subjects develop the knowledge and skills that will enable students to:

- apply basic mathematical and scientific concepts for the description and solution of engineering problems,
- develop initial proficiency in mechanical engineering disciplines,
- develop the ability to conduct experiments, and critically analyze and interpret data,
- perform mechanical engineering integrated design of systems, components, or processes by means of practical experiences (group projects),
- identify, formulate, and solve mechanical engineering problems using modern engineering tools, techniques, and skills,
- collaborate in group projects,
- develop their written and oral communication skills through presentations of project results,
- acquire an appreciation for some of the ethical problems that arise in the exercise of the profession,

Department-Level Mathematics Component

Table (5.4) lists the mathematics subjects required by the program. These subjects lay the foundation for students to understand and apply fundamental mathematical concepts and tools to the solution of engineering problems. Realizing the importance of this area, the program requires that students complete the following set of subjects. These subjects comprise a sequence of 3 years of study with total number of credit hours in this area of 13 credit hours.

Table (5.4): Mathematics Requirements\General Mech. & Aero. Engr.

Mathematics		
Code No.	**Subject Name**	**Credit Hours**
ME101	Mathematics / I	4
ME201	Mathematics / II	4
ME301	Eng. and Numerical Analysis	5
Total		13
% of Total		11.5 %

General Education

General education category of the program is divided into two components: Technical engineering component (non-mechanical) and non technical component including social and humanity component. Required engineering fundamentals for the General Mechanics & Aeronautical Engineering program are listed in Table (5.5) & (5.6). Detailed distribution of the credit hours of the curriculum for Mechanical and Aero Engineering program are discussed in the following subsections and presented in figure (5.2.).

Table (5.5): Requirements for Humanity Component General Mech. & Aero. Engr.

Humanities		
Code No.	**Subject Name**	**Credit Hours**
ME107	Human Rights	2
ME208	Freedom and Democracy	2
Total		4
% of total		3.5 %

Table (5.6): Engineering Fundamentals Requirements General Mech. & Aero. Engr

Engineering Fundamentals \ Preparatory Common Subjects		
Code No.	**Subject Name**	**Credit Hours**
ME103	Eng. Drawing and Descriptive Geometry	5
ME106	Programming / I	3
ME206	Mechanical Drawing	3
ME207	Programming / II	5
Total		16
% of Total		14 %
Engineering Fundamentals \ Supporting Subjects		
ME105	Electrical Eng. / I	3
ME307	Electrical Engineering / II	3
Total		6
% of Total		5.3 %

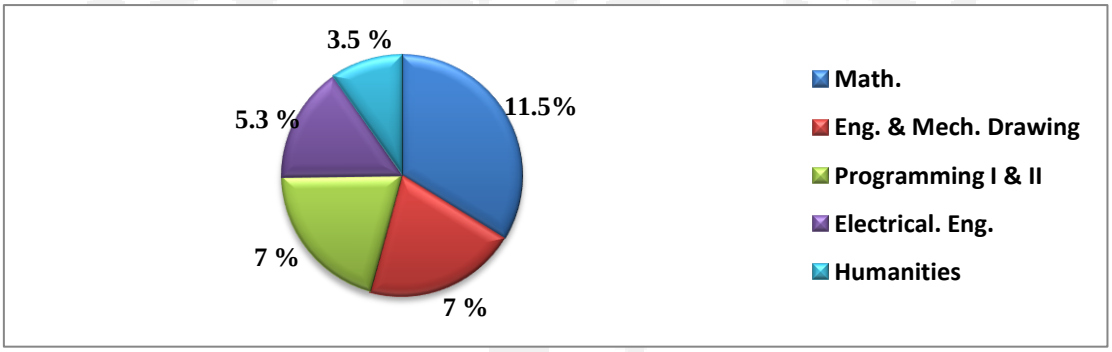


Figure (5.2): Detailed Distributions of Math. & General Education Subject Groups

Topics Core of Mechanical Engineering Requirements

True exposure to engineering program is offered to our undergraduate students through enrollment in taking subjects within the ME department, such as Engineering Mechanics, Heat Transfer, Design of Machine Elements, Thermodynamics… etc.

To ensure that all students are well versed in a cross-section of core mechanical engineering topics, the program is structured around a set of required subjects. The total Mechanical & Aero Science Component accounts for 74 & 75 credit hours respectively. These subjects are shown in Table (5.7.) which represents the core classes form the heart of the mechanical curriculum and provide the technical background necessary for mechanical engineering work. In addition, the subjects include the following:

Mechanical Eng. Laboratories / I, II& III

Practical experiences are necessities of engineering education in terms of translating the principles and theoretical basis of knowledge and engineering equations and the laws that is taught to students into scientific facts concrete in front of them, to have the ability to absorb the theoretical part, and also to have the confidence and credibility to the received theory. Despite the limited possibilities available in our laboratories, we are trying to achieve as much as possible of the objectives envisage for the completion of laboratory tests and those goals are as follows:

- Give the student experience in how to deal with equipment and laboratory equipment and practice with them.
- The student's education on how to read and gain information from measuring instruments and record them correctly.
- Ability of the student to write reports and draw graphs and make tables organized in a scientific manner.
- Ability of students to discuss the results and findings in a scientific way and reached important conclusion from this debate.

The students required to complete for a total of 9 Credit hours for mechanical engineering laboratories.

Engineering Project

Graduation project for the senior students is the application of what the student has learned over the years in the field of study or particular competence. The project includes the practical part in addition to the theoretical part. The following up of the implementation of the project is continuous. The students have to submit semi-annual reports on the progress of the project. The credit hours in this area are 4 credit hours.

Figure 5.3 presents the detailed distribution of the credit hours of the all curriculum of subject groups discussed above.

Table (5.7): General Mechanics Engineering Required Core Subjects

Mech. Core Subjects		
Code No.	**Subject Name**	**Credit Hours**
ME102	Eng. Mechanics	5
ME104	Principles of Production Eng.	4
ME202	Fluid Mechanics / I	4
ME203	Thermodynamics	3
ME204	Mechanics of Materials and Machines	4
ME205	Eng. of Metallurgy	2
ME209	Mechanical Eng. Laboratories / II	3
ME302	Fluid Mechanics / II	4
ME303	Heat Transfer	3
ME304	Strength of Materials	3
ME305	Mechanics of Machines and Vibrations	3
ME306	Principles of Manufacturing Processes	4
ME308	Mechanical Eng. Laboratories / III	3
ME401	Design of Machine Elements	6
ME402	Control and Measurements	3
ME403	Air-Conditioning and Refrigeration	4
ME404	Power Eng.	4
ME405	Industrial Eng.	3
ME406	Engineering Materials	2
ME407	Engineering Project	4
ME408	Mechanical Eng. Laboratories / IV	3
	Total	**74**
	% of Total	**65.5 %**
Aero. Core Subjects		
ME309	Introduction to Aeronautical Science	4
ME310	Aircraft Structure	3
ME311	Manufacturing Processes and Engineering Materials for Aircrafts	4
ME409	Aerodynamics	3
ME410	Jet Engines	3
ME411	Aircrafts Performance and Systems	4
	Total	**75**
	% of Total	**65.8 %**

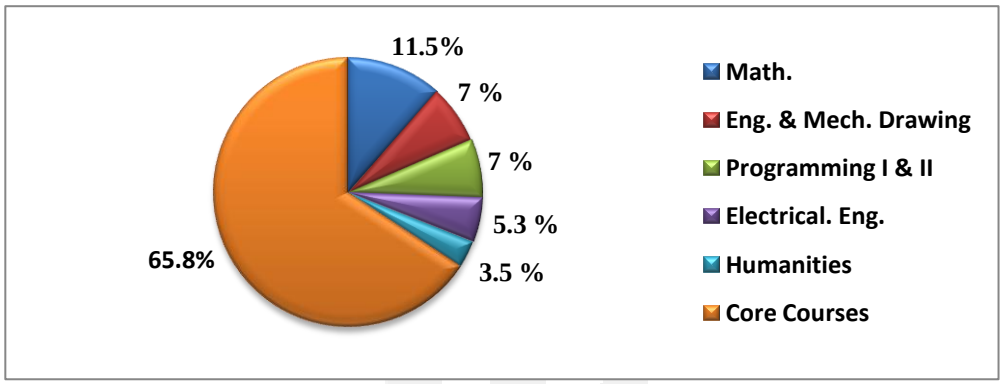


Figure (5.3): Detailed Distribution of Subject Groups General Mech. & Aero. Engr.

Table (5.8) shows the example section size of each of the core subjects for the fulltime of the academic year 2010-2011.

Table (5.8): Core Subjects and Section Size Summary \ General Mech. & Aero Eng. (2010/2011)

Code No.	Responsible Faculty Member	No. of Sections offered in Current Year	Avg. Section Enrollment	Percentage distribution of educational decisions (%)		
				Th.	App.	Exp.
ME102	Nabeel Hassan & Wedad Ibraheem	3	62	75	25	
ME104	Ahmed A.A. AL-Khafaji	3	62	50		50
ME202	Ihsan Y. Hussain	3	65	75	25	
ME203	Issam M. Ali	3	65	75	25	
ME204	Fathi Abd Sahib Alshamma	3	65	75	25	
ME205	Abbas A. Abed	3	65	100		
ME209	---------	3	65			100
ME302	Najdat N. Abdullah & Akram W. Ahmed	2	43	75	25	
ME303	Manal H. AL-Hafidh Akram Wahbi Ahmed	3	53	75	25	
ME304	Majid H. Faidh-Allah	3	53	75	25	
ME305	. Ahmed Abdul-Hussein & Luay	3	53	75	25	
ME306	Haithem Hashem & S.Gazy	2	43	75	25	
ME308	_____	3	53			100
ME309	Iman J. Oda	1	10	75	25	
ME310	Ali A. Alasadi	1	10	75	25	
ME311	Ghassan Lu-ay Al-Ani & Ban B. Jawad	1	10	75		25
ME401	Mohammad Q.Abdullah & Ibtihal S. Abbas	3	70	50	25	25
ME402	Adnan N. Jameel	3	70	75	25	
ME403	Khalid A. Joudi & A.N.S.Kassim & Najm. A	3	70	75	25	
ME404	Karima E. Amori & Adnan A. Alazawi	2	55	75	25	
ME405	Iman Q. Abdulhussein & KwaKib A.	2	55	75	25	
ME406	Basim S. B. & Thamer S.	2	55	100		

D. ***Adequacy of Each Curriculum Component***

As has been shown in A.2- above, adequate time and attention is given to each curriculum component such that it meets the program objectives and outcomes.

- ***Summer Training***

The mechanical engineering curriculum requires students to complete sixty days of summer training at private industries or governmental firms. This training is a compulsory component of graduation requirements. It is supervised by the Summer Training Committee of the department. Summer training gives the students the chance to combine the formal classroom's study and the relevant practical experience. This program aims at bringing the student to distinguish professional standards required at the industry. It also provides the student with the knowledge of what is to be expected of engineers together with identifying working areas of mechanical engineers. This training program is a strong support of our educational objective since it provides industrial training to facilitate the student's integration into professional life. During the third year of the program, the student must take summer training work. A supervisor designated by the training institution or company evaluates the student's work during summer training. This training program is not credited by hours, but it should be fulfilled before graduation. The student also gets the chance to apply the theoretical part of the subjects he learned.

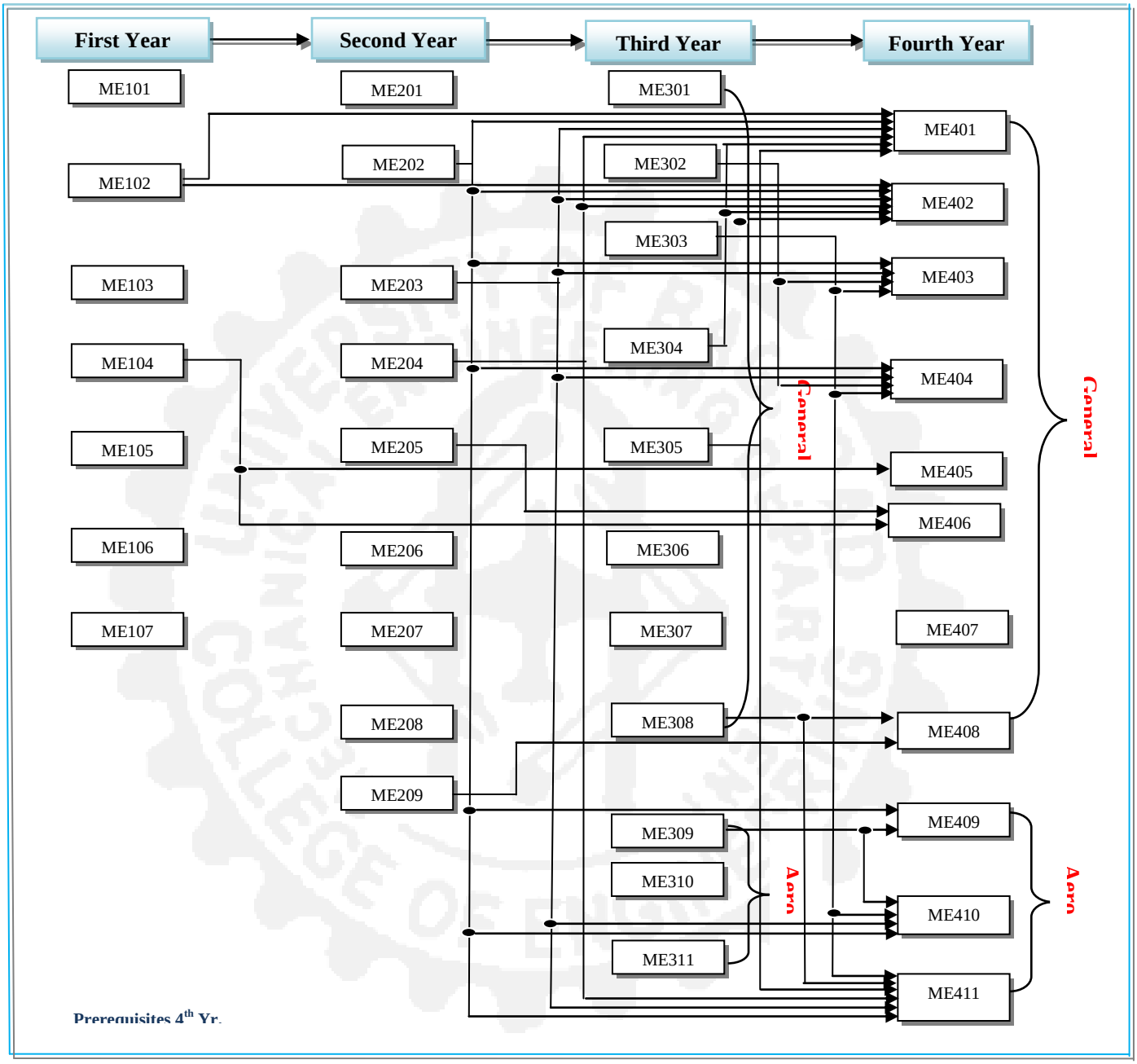
- ***How the Curriculum Aligns with the Program Educational Objectives***

The faculty has complete authority to define, revise, implement, and achieve program educational objectives. Input is required from the students, alumni, and the employers of our alumni in the implementation of program objectives. The major role of the faculty is to create, revise, and evaluate subjects for the program as well as define and revise program educational objectives and ensure achievement of student outcomes. Therefore, the above process ensures alignment of the curriculum with Program Educational Objectives as shown in various tables.

The Mechanical faculty insures that the students receive all the engineering analysis within the context of engineering program. At our faculty meetings, the discussion is possible subjects to be introduced in the different subjects and brainstorm on ways to bring engineering program and open-ended problems into our subjects. Many of our subjects include a term project in which the students work in groups and apply the knowledge and skills acquired in the subject to the solution of an open-ended problem.

E. *Prerequisite Flow Chart*

A flow chart showing the prerequisite structure of the 4th year program's subjects required towards the major is given in figure (5.4).



CRITERION 6: FACULTY

A. Leadership Responsibilities

The head of the department is appointed by the President of the University based on the recommendation of the Dean of the Faculty of Engineering. The authority of the department's head spans in general for four conductive years. At the end of four years, the authority can be extended or another faculty member is appointed to take his place. The department's head assigns the members and coordinators of the department and various committees. He distributes the administrative tasks and academic affairs to the designated department Committee. The department's head leads the department council meetings and represents the department at the college of engineering's council meetings. The specific responsibilities include:

- Promote the department and its ascendant stature to the national and international communities, both academically and professionally.
- Foster and nurture external relationships, with particular attention to development and fundraising.
- Advocate for the department cooperation within another departments of engineering and the university at large.
- Advance the unification of the Department's various pedagogical and research missions.
- Facilitate interdisciplinary activities within the Department including the advancement of new technologies.
- Maintain and strengthen the academic and research relationships between the Department and its constituencies.
- Promote collaboration within other universities
- Maintain a positive and supportive working environment for the classified and administrative and professional staff.
- Manage the department's budget.

B. Authority and Responsibility of Faculty

Our full-time faculty responsibility includes teaching, research, institutional and committee services, and professional society services. Most of the department academic and the general program issues are taken care of by the relevant committees. Usually, course modification and evaluation is the main task of the scientific committee. However, a faculty member can initiate the creation of a new course. Major curriculum renovation is usually presented by the scientific committee at the department's General Board meeting where each faculty member has the chance to interfere in the creation or modification process. The curriculum modification proposal is presented to the college of engineering curriculum committee for final approval.

- **Council of the Department**

The department's council members are restricted only to those that carry the rank **Assistant Professor** and **Professor**. The council has the following authorities:

1. Discussing the syllabus, the textbooks and its change in light of the recommendation of teaching staff members.

2. Presenting suggestions for the department's needs for teaching staff, technicians and the invitation of guest teachers.
3. Authorization of scientific research projects presented by staff members and suggesting methods in for their completion, recommending the organization of scientific research, published and translated books and caring for the student's projects and providing the necessary equipment for executing them.
4. Executing the college council's resolutions.
5. Compilation of educational and scientific committees according to the department's needs.
6. Supervising teaching process and its development, the teaching staff and department personal performing their duties and the student's scientific affairs for all classes by unremitting supervision scientifically and practically.
7. Following up on the scientific development and the race for knowledge, directing the teaching staff and other department personal towards their duties and the students' scientific affairs through the different stages of their education by constant scientific supervision.
8. Conveying some of its authorities to the head of the department.
9. Determining the department's general policy features.
11. Determining and following up on the execution of the department's scientific plan.
12. Looking into the transfer of students from other departments' colleges and universities.

- **Department Coordinator**

The duties that fall on the department's coordinator are:

1. Follow up the presence of the teaching staff and personal and register any absence without justification or excuse.
2. Following up on management between the department and the dean's office activities
3. Registration and following up on management orders concerning this.
4. Organizing the weekly time table for lectures and following up on any changes.
5. Supervises the work of the purchasing committee, student's affairs committee, & social activities.

C. ***Faculty Competencies***

ME department employs fully 6 staff members with Ph.D. degrees from highly reputable international universities. The department has 6 Professors, 16 Assistance Professor, 25 Lecturer, and 19 Assistance Lecturer. The number of faculty staff changed through the last ten years while the number of enrolled students is fluctuating. The course load is distributed in accordance with faculty rank; that is; 6 credit hours maximum for Professor, 8 credit hours maximum for an Assistance Professor, 10 credit hours maximum for Lecturer, and 12 credit hours maximum for Assistance Lecturer. Any extra course load for each faculty member is compensated for financially. The faculty work load for the fulltime of the academic year 2010-2011 is shown in Table (6.2). The table also shows an example the distribution of the faculty activity.

Table (6.2): Samples of Faculty Teaching Load Summary (Academic Year 2010/2011)

No.	Faculty Member (Name)	FT or PT	Classes Taught (Course No. /Credit Hrs.) Fulltime Academic Year	Program Activity Distribution%		
				Teaching	Research	Other
1	Khalid A. Joudi	FT	ME403 (4)	40	30	30
2	Najdat N.Abdulla	FT	ME302 (4)	40	30	30
3	Ihsan Y. Hussain	FT	ME202 (4)	60	30	10
4	Hussain Y.Mahmood AL-Hussainy	PT	ME103 (5)	20	80	/
4	Adnan N.Jameel Al-Tamimi	FT	ME402 (3)	60	30	10
5	Adnan A. Alwan Al Azzawi	PT	ME404 (4)	30	10	60
6	Manal hadi saleh Al – Hafidh	PT	ME303 (3)	20	80	/
7	Mohammad Q.asim Abdullah	PT	ME401 (6)	20	80	/
8	Ali A. Hasan Al-Asadi	FT	ME206 (3), ME310 (3)	60	30	10
9	Soroor K. H. Al-Khafaji	FT	ME105 (3)	60	30	10
10	Karima E. Amori	FT	ME404 (4), ME309 (3)	60	30	10
11	Ahmed Abdul Hussain	FT	ME305 (3)	60	30	10
12	Wedad I. majeed	FT	ME102 (5)	60	30	10
13	Akram W.Ahmed Ezzat	FT	ME302 (4), ME303 (3)	60	30	10
14	Abbas Abdul-Hussein	FT	ME205 (2)	60	30	10
15	Iman J. Ooda	FT	ME309 (3), ME410 (3)	60	30	10
16	Kareem j.kadhum Al- Shamsi	FT	ME411 (4)	60	30	10
17	Ahmed Abdulrasool Ahmed Al -Khafaji	FT	ME104 (4)	60	30	10
18	Majid Habeeb Faidh-Allah Thulfokar	FT	ME304 (4)	60	30	10
19	Issam M. Ali Al-jubury	FT	ME203 (3)	60	30	10
20	Luma F.Ali	PT	ME209 (3)	20	80	/
21	Najim A. Jasim	FT	ME403 (4)	60	30	10
22	Ghassan luay Al-Ani	FT	ME103 (2), ME311 (4)	60	30	10
23	Louay S.Yousuf	FT	ME305 (3), ME209 (3)	60	30	10
24	Haithem H. Mohamed Hassan	FT	ME306 (4), ME209 (3)	60	30	10
25	Ibtehal A.Sadiq Faid Allah	FT	ME401 (6)	60	30	10
26	Maki H. majed	FT	ME411 (4)	60	30	10
27	Iman Q. Abdulhusein	FT	ME301 (5), ME405 (3)	60	30	10

FT = Full Time Faculty, PT = Part Time Faculty

D. *Faculty Size*

Adequacy of the Size of the Faculty

The number of faculty members in the ME department for the academic year 2011-2012 is (66). It is adequate to teach the required courses and also to perform other tasks related to program assessment and continuous improvement. By gender; the faculty is 72% male and 28 % female. By academic rank, 9% are Full Professors, 24% Assistance Professor, 38% Lecturer, and 28% Assistance Lecturer.

The faculty is organized around several technical areas in ME classified in three main specialties; Thermo-Fluids, Applied Mechanics, and Manufacturing & Industrial Engineering.

Tables (6.3) & (6.4) show an example list of the faculty members' size and their status and the primary areas of interest of the faculty. *We should mention here that **12** of the faculty members are now joining Ph.D. programs to obtain the Ph.D. degree, **8** inside and **4** outside the country.*

We seek to employ faculty who are strong in teaching and research. Our retention, tenure, and promotion criteria emphasize excellence in both teaching and research. In addition, because of our emphasis on a practice oriented curriculum and research, we seek to employ faculty who have both academic and professional backgrounds and an ability to develop and sustain research programs.

The ME student to full-time faculty ratio is approximately 7.3:1 (for Ph.D. Carriers staff), 9.2:1 (for M.Sc. Carriers Full-Time staff), and 4:1 (for Full-Time total staff) which is close to the average in the College of Engineering. Consequently, we are able to provide sufficient interaction program with students.

Our Mechanical class sizes are small, with an average of 28 in lecture sections, and 6 in lab sections. Relatively small Mechanical class sizes mean our students have more access to faculty than do those at most other institutions.

Table (6.3): ME department faculty size (Academic Year 2011/2012)

Specialization	Certificate		Rank				Gender		Total
	PhD	Msc.	Prof.	Ass. Prof.	Lec.	Ass. Lec.	Male	Female	
Thermo-Fluids	13	14	4	7	9	7	20	7	27
Applied Mechanics	11	10	1	6	7	7	17	4	21
Manufacturing & Industrial	6	9	1	3	7	4	10	5	15
Others	/	3	/	/	2	1	1	2	3
Total	30	36	6	16	25	19	48	18	66

Code: Prof. = Professor, Ass. Prof. = Assistance Professor, Lec. = Lecturer, Ass. Lec. = Assistance Lecturer

Table (6.4): Faculty Research and Areas of Interest

Faculty Member	Rank	FT or PT	Research and Areas of Interest
Khalid A. Joudi	Prof.	FT	Air Conditioning and refrigeration, Solar Energy
Najdat N.Abdulla	Prof.	FT	Turbulence, Fluid Transient
Ihsan Y. Hussain	Prof.	FT	Fluid Mechanics, Heat Transfer (Free, Forced and Mixed Convection), Porous Media
Hussain Y.Mahmood AL-Hussainy	Prof.	PT	Aerodynamics , Fluid mechanics
Adnan N.Jameel Al-Tamimi	Prof.	FT	Fracture mechanics, Vibration of shells, Dynamic stress
Adnan A. Alwan Al Azzawi	Ass. Prof.	PT	Internal combustion engines
Saad M.Saleh	Ass. Prof.	FT	Solar Energy, Renewable Energy
Manal hadi saleh Al – Hafidh	Ass. Prof.	FT	Porous Media/Flow and Heat Transfer, Air Pollution
Mohammad Q.asim Abdullah	Ass. Prof.	PT	Machine Design, Stress Analysis, Gear Design
Ali A. Hasan Al-Asadi	Ass. Prof.	FT	Hydraulic Control Systems
Soroor K. H. Al-Khafaji	Ass. Prof.	FT	Statistical Quality Control and Reliability Engineering
Karima E. Amori	Ass. Prof.	FT	Renewable energy solar and underground, Fluid dynamics
Ahmed Abdul Hussain	Ass. Prof.	FT	Robot design and deflections, Contact of rough engineering surfaces
Wedad I. majeed	Ass. Prof.	FT	Stress Analysis, Free and Forced Vibration for Composite Materials
Akram W.Ahmed Ezzat	Ass. Prof.	FT	Fluid Mechanics, Heat Transfer (Free, Forced and Mixed Convection)
Abbas Abdul-Hussein	Ass. Prof.	FT	Engineering Metallurgy
Iman J. Ooda	Lec.	FT	Computational fluid dynamics.
Kareem j.kadhum Al-Shamsi	Ass. Lec.	FT	Structure of aircraft, Maintenance of aircrafts
Ahmed Abdulrasool Ahmed Al -Khafaji	Lec.	FT	Production Processes, Quality Control
Majid Habeeb Faidh-Allah Thulfokar	Lec.	FT	Gears Types, Spines Shafts, Plates and Shells, Composite Material, Vibration
Issam M. Ali Al-jubury	Lec.	FT	Air conditioning
Iman Q. Abdulhusein	Ass.Lec.	FT	Industrial Engineering, Quality Control, Quality Management
Wail S.Wadee Sarsam	Lec.	FT	Two-Phase Flow, Two-Phase Heat Transfer, Refrigeration & Air-Conditioning
Najim A. Jasim	Lec.	FT	Central Air Conditioning and Refrigeration, Clean Room HVAC Systems
Ghassan luay Al-Ani	Lec.	FT	Cryogenic Quenching, Relieving Residual Stresses by Vibration

1. Code: Prof. = Professor, Ass. Prof. = Assistance Professor, Lec. = Lecturer, Ass. Lec. = Assistance Lecturer
2. FT = Full Time Faculty, PT = Part Time Faculty

Interactions with Students

Quality teaching and student interactions are emphasized in ME department. All faculty members maintain regular posted office hours, and most have an open-door policy; supervise senior design project teams, requiring regular weekly meetings with the students; and many serve as advisors to undergraduate research projects. Faculty members also serve as advisors for professional societies requiring attendance at chapter meetings, advising student leaders, and traveling with students to regional and national conferences and competitions. The feedback from students and alumni is always very positive on the interactions between faculty and students.

Interactions with Industry and Government

The department contributed over many years in providing services to several different state offices and the private sector as well. These services have included a variety of activities including engineering consultancy, to conduct preliminary and final designs, check designs, supervision of project implementation, organizing courses and developmental courses of continuing education, research and evaluation of patents, contract research for postgraduate students with state offices, and other activities. The implementation of these activities is usually made through the Committee of Cooperation Mechanism in the department and college. The department had still take care to involve most of the faculty and associate these activities just as much as possible. These activities have included a variety of business lines and multiple functions covered all branches of mechanical engineering,

Student Advising

Freshman advising is handled by the Committee of Student Affairs in the Department of ME. The Committee consisting of some members of the faculty, headed by the department's head, is responsible for advising students in ME programs. The faculty advises, motivates, and helps students with their professional development. The attitude and energy of some of our faculty is such that interaction with our students in activities such as design projects, laboratory work, and industry projects helps with monitoring, advising and mentoring. There are occasions in which faculty members spend time with students outside the classroom on special projects and in undergraduate research activities. Students' advising is provided by all faculty members based on expertise and guidance as preferred by the student. The faculty members are dedicated to providing professional counseling to students and are able to relate very well to the student both inside and outside the classroom. Criteria 1 show the self-assessment questioners for students.

E. *Faculty Development*

The number of faculty in mechanical engineering, their educational backgrounds, their industrial and academic experiences and involvement in research, all attest to the overall excellence of the program. Faculty professional development activities include: attending seminars and lectures, participation in training workshops, attending professional conferences, professional writing activities, review activities, conducting new and original research, training programs inside and outside Iraq. Professional development opportunities those are available to faculty members include:

- **Leave of Absence*:*** An institutional program allows faculty who have not completed a Ph.D. degree and are in a tenure or tenure-track position to obtain a leave of absence to study advanced degrees in recognized universities. Faculty members are expected to return and serve for every year they get sponsored. The ministry provides tuition, travel, and a monthly stipend. Those who are not in tenure-track positions also participate through temporary contracts with the same benefits.
- **Center for Continuing Education** The center offers professional development courses and training to faculty and to recently admit graduate teaching assistants. The entire faculty benefits from this program, which offers courses in a wide range of areas of interest.
- **Sabbatical Leave*:*** The University supports a faculty professional leave (sabbatical) activity after five years of service. Some members of the faculty take advantage of this opportunity.

F. *Faculty Evaluations*

Annual faculty evaluations are made, which are measure of the quality of the faculty activities and performance in teaching, research, and service.

CRITERION 7: FACILITIES

A. Space

ME Department faculty and students have sufficiently adequate (with minimum requirements) facilities available for conducting a successful program. These facilities include several classrooms, laboratories, workshop, faculty offices, department library, and network access facilities. We have two large (50 chairs) meetings and conference rooms, both equipped with computer integrated projection equipment (LCD and/or Data Show). Also a break room equipped with sufficient requirements. The network access facilities are provided by the Computer Center of Baghdad University in form of a Wireless LAN network available in all university buildings. Only 10 terminals are available now in the department.

- **Faculty Offices**

The faculty offices are located in buildings 1 and 2. Most of these offices are for two faculty members each, and some are for three members. The offices have adequate furniture, but they are not air-conditioned and not equipped with computers or network connection. It should be noted, though, that the faculty offices are small in size such that they are inadequate to hold a discussion between the faculty and more than 2-3 students. The average faculty office space is about 10 square meters.

- **Classrooms**

Table (7.1) provides the classrooms types and sizes and the number of students (or persons) the classroom can accommodate. They were equipped with blackboards, and some with whiteboards, as the main tool for lecture presentation. They were lake the network or high resolution projectors which can be used to deliver electronic class notes and perform in-class demos and presentations.

Table (7.1): Classrooms Types and Sizes

Classroom		Area (m^2)	Maximum No. of Students
Room No. / Name	Type		
M1	Lectures	54	40 (now used as a store)
M2	Lectures	54	40
M3	Lectures	54	40
M4	Drawing Room	239	50
M5	Lectures	135	60
M6	Lectures	153	120
M7	Lectures	108	60
M8	Lectures	48	40
M9	Lectures	53	40
M10	Lectures	53	40
M11	Lectures	53	40
M12 / Dr. Shaker	Lectures	120	100
M13 / Dr. Abdulla	Lectures	120	100
Dr. Munther	Meetings, Seminars….etc	54	50
Prof. Nema	Lectures PG-Students	62	50
Meetings	Meetings, Seminars….etc	47	50

- **Laboratories**

ME department contains many laboratories and workshops which includes many devices and equipment used to conduct the experimental tests by undergraduate students and it is helpful to conduct the engineering projects by the forth class students, in addition to the ability of using many of them to achieve different tests and other works to the government establishments, private sector, postgraduate students and researchers generally. These labs are located in buildings 1, 2, and 4. Table (7.2) summarizes the list of available labs and their sizes.

Table (7.2): Laboratories of the Department

	Lab Name		Location (Building No.)	Subjects Served by Lab.	Lab Capacity number of students/session	Lab. space (m^2)
1	Heat Lab.	Heat Transfer	1	ME303, ME407	8 - 10	396
2		Thermodynamics	1	ME203,ME407	8 – 10	
3		Power Plants	1	ME404, ME407	8 – 10	
4		I.C. Engines	1	ME404, ME407	8 – 10	
5	Dynamic Lab.	Control	1	ME402, ME407	8 – 10	140
6		Vibration	1	ME305, ME407	8 – 10	
7		Theory of Machines	1	ME204, ME305, ME407	8 – 10	
8	Strength of Material		1	ME204, ME304, ME310, ME407	8 – 10	270
9	Computers		1	ME103, ME106, ME207, ME301, ME401, ME407	20 - 30	148
10	Air-Conditioning		1	ME403, ME407	8 – 10	216
11	Measurements		1	ME104, ME306, ME311, ME407	8 – 10	102
12	Fluid Mechanics		2	ME202, ME302, ME309, ME409, ME407	8 – 10	344
13	Wind Tunnel		2	ME410, ME407	/	216
14	Metallurgy		4	ME205, ME406, ME407	8 – 10	324
15	Electrical Engineering		4	ME105, ME307	8 – 10	32
16	Workshop		4	ME104, ME306, ME311, ME407	40 - 50	2300

- **Libraries**

The students can have access to three libraries as follow:

Department's Library: It was a newly established, in 2009 offers services to the students, faculty members, engineering and technical staff of the department. It was also accessible to students and researchers from other departments in the college, from other colleges inside or outside the university, and for researchers from various state offices and ministries. In brief, the library has the following facilities: Area of the library (48 m^2),520 Books, 150 Periodical, 435 P.G. Theses and dissertation, 511 B.Sc. Graduation Projects, 60 B.Sc. Students' Seminars, 178 CDs, 2 Internet Access Terminals, About 50 Title and 7000 books in the free bookshop as a textbooks for undergraduate students.

College Library: Library of Engineering College is the oldest scientific libraries in the University of Baghdad. It was established in 1941, and then developed well in the later years to become mother libraries in engineering that contains more than (74901 books) and (1450 periodicals titles). It is offers services to the students, faculty members, and researchers from inside and outside the college. Lastly, the library finished the documentation of all books, periodicals, theses and dissertations in a complete data base to facilitate the accessing process for students and researchers. The library continuously organizes and / or participates in book fairs.

B. Resources and Support

B.1 Computing Resources

As stated above, network access facilities are provided by the Computer Center of Baghdad University in the form of a Wireless LAN network available in all university buildings. Only 10 terminals are available now in the department. Both faculty and students can access the network.

B.2 Laboratory Equipment Planning, Acquisition, and Maintenance

One of the challenging problems encountered is the lack of laboratory equipment and instrumentation in labs, in spite of considerable progress achieved by the department in this area in the last year. MED continuously addresses any upgrades/additions for labs by estimating yearly budget needed that submitting to college and university. The full process used to determine the department lab budget is divided into two levels:

College and university level:

At the end of each fiscal year, the planning committee is required to review the needs of major equipment and PCs of all academic colleges and departments make consolidated recommendations for the allocation of an appropriate budget for the next fiscal year. A memo will be sent to all the academic colleges/departments by the chairman of the university planning committee before the end of every fiscal year requesting them to prepare their lists of major equipment and PCs for labs to be procured during the following fiscal year. A standard form is provided to all the departments to fill their lists of major equipment and PCs for labs.

Department level:

The Head of the labs committee in the MED is used to send a memo to all the faculty and lab supervisors to prepare the list of major equipment for all the labs to be procured during the present fiscal year. The lists of items required be prepared for providing appropriate information (*Item description, quantity, estimated unit cost, Total amount, Priority, justification ...etc).* These form the basis for future lab budget allocations and justifications. The objective is to upgrade/enhancement of lab facilities is to:

- Support lab experiments, students senior design projects, course projects, and PG thesis and dissertation work.
- Support the conduct of newly proposed lab experiments.
- Support setting up of new labs proposed in the emerging areas.
- Support faculty research.
- Remove obsolescence (i.e., Modernization of the labs).

In the fiscal year 2010, about (50,000,000.00 ID) was spent for purchasing new laboratory equipment and maintaining some equipment. In the fiscal year 2011, the number increased to about (100,000,000.00 ID).

The laboratory equipment planning, acquisition, and maintenance processes are adequate with minimum requirements for achieving the program's outcomes at the MED.

CRITERION 8: INSTITUTIONAL SUPPORT

A. Program Budget Process

MED budget is part of the overall College of Engineering budget. Table (8.1) below details the budget allocated to exchange department for fiscal year 2011

Table (8.1): Department Expenditure (Fiscal year 2011)

No.	Paragraphs on the financial aspect.	Amount in Iraqi Dinars
1	Total budget allocated to the department.	**2368153152**
2	Total salaries of teachers in the department.	**1596555275**
3	Total salaries of employees in the administrative and auxiliary services.	**635029627**
4	Total wages additional lectures charged by faculties**.**	**46816000**
5	Total funds allocated for maintenance of buildings and equipment.	**28706250**
6	Sum of the amounts allocated for equipment, materials and supplies.	**54026500**
7	Total funds allocated for the purchase of books and periodicals and references.	**-**
8	Sum of the amounts allocated for conferences and seminars.	**-**
9	Sum of the amounts allocated for the purposes of scientific research and graduate studies.	**-**
10	Sum of the amounts allocated to the training of teachers and employees in the administrative apparatus.	Within the financial assignments to the University Within the financial assignments to the University
11	Sum of the amounts allocated to the purposes and other expenses such as exhibitions, ceremonies and other.	Within the financial assignments to the University Within the financial assignments to the University
12	Sum of the amounts allocated to the workshops and labs.	Within the financial assignments to the University Within the financial assignments to the University
13	The total amounts allocated to student services.	**-**
14	The total amounts allocated to scientific dispatch.	Within the financial assignments to the University Within the financial assignments to the University
15	Total funds allocated for the purchase of textbooks.	**7019500**
16	Sum of the amounts allocated to incentives and rewards.	**-**

B. Sources of Financial Support

University of Baghdad and its colleges are supported from government institution, with the entire budget coming from the Iraqi government. It also receives some grants and gifts from some state offices, institutions, from some international organizations and civil society organizations. However, such contributions amount to only a small fraction of the government allocations. Thus, the main source of departmental financial support is from government allocations. Additional sources of departmental financial support come indirectly from faculty funded research grants, experimental tests made in some laboratories for various state organizations, and industry consultations. All these activities are covered by the Central Cooperation Mechanism Committee of the university, which is working according to the law of cooperation mechanism.

C. Inadequacy of Budget

The MED has great shortage and inadequacy in budget to continue updating and enhancing the labs, to achieve its program's outcomes, and to support the faculty's teaching and scholarly activities.

D. Support of Faculty Professional Development

As stated in the Faculty Development article in Criteria 6, the faculty professional development efforts represent a prime objective of the department, college and university administrations and are manifested in the following two areas:

1. Academic Development, which is administered by the Ministry (R & D Office in the MOHESR), College and University.
2. Research Development, which is administered also by the Ministry (R & D Office in the MOHESR), College and University.

Funding allocated is inadequate for the needs of both lines. Accordingly, both planned activities and allocated funding are inadequate for the faculty professional development.

E. Support of Facilities and Equipment

The allocation of office space and laboratory facilities is the responsibility of the college and university with suggestions and recommendations from the department. On the other hand, the scheduling of classrooms is the responsibility of the department.

College maintenance department is responsible for all maintenance related. The college maintenance department accepts maintenance requests from the departments through written orders. In general, the support of facilities and equipment is inadequate to achieve program's outcomes in a perfect manner.

F. Inadequacy of Support Personnel and Institutional Services

MED has one unqualified secretary to assess the department in all administrative aspects. Similarly, the department relies on the college Network/Computing services group for support on computing and networking facilities.

The department has no engineer or technician to supervise the tasks of running, maintaining, and upgrading the various teaching and research laboratories at the

department. Accordingly, the aforementioned personnel resources are inadequate to meet the program's outcomes. Furthermore, the department and faculty rely heavily on some resources and support facilities provided by the college and university. These include: *Electronic Computer Center of the University, Purchasing Committees in both college and university, Maintenance Department in the college, College Library, Central Library of the University.*

With respect to the college and university libraries, both contain a good collection includes books, periodicals, proceedings, theses, reports, maps, charts, electronic resources, and audiovisual materials. The libraries provide assistance to the faculty and students in their search for information and library materials.

CRITERION 9: SCIENTIFIC RESEARCH

Note: This criterion has been added in the current report.

A. Introduction

Scientific research and teaching are interdependent and interacted. Teaching and scientific research was a dialectical unit. Teaching is the basis of scientific research, scientific research contribute to the development and upgrading of teaching. From the teacher point of view, engaged in scientific research activities is the most important way to improve their own academic standards and research capabilities. The updates of textbook content, the experiences and methods, are all contributed to the process in the scientific research.

Scientific research plays a vital role in passing contemporary knowledge onto the student. This is a relationship where the excitement of engaging with the development of the knowledge base of the discipline itself contributes to student learning.

The Department of Mechanical Engineering linked financially with the College of Engineering, and the college financially linked with the University of Baghdad, which is in turn linked with the Ministry of Higher Education and Scientific Research.

B. Inadequacy of Budget for Scientific Research

The MED has great shortage and inadequacy in budget required for scientific research. Financial allocations are usually limited because of the limited budget of the college. The funding allocated to the department is inadequate, especially in the following aspects:

1. Purchasing of laboratory equipment and set up advanced laboratories.
2. Development of teaching aids.
3. Send faculty members to advanced countries, participation in training programs in order to keep pace with scientific development in those countries.
4. Financial support for publishing abroad or participating in International Scientific Conferences.
5. Support the researches of postgraduate students (M.Sc. & Ph.D.) in purchasing equipments and instrumentations and constructing their test rigs, or help them in the cost of analysis (numerical resources).
6. Holding Conferences, Symposiums, Seminars, Workshops….. etc.
7. Purchasing of modern books and journals.

C. Samples of Scientific Researche Activities

The scientific research of the MED faculty includes wide range of activities inside and outside Iraq. The following is a very brief and rough statistics for the sum of the scientific research activities of all faculty members of the department during the academic year 2011 – 2012:

- Publication (and acceptance of publication) of about ***62*** researches in Iraqi Journals.
- Publication (and acceptance of publication) of about ***20*** researches outside Iraq.
- Holding the ***2nd*** Scientific Conference for Students Researches and Activities.
- Holding about ***10*** Scientific Symposiums and workshops.
- The number of participations and presence in Symposiums and Conferences inside Iraq was about ***200***.

- The number of participations and presence in Symposiums and Conferences outside Iraq was about ***23***.
- Holding about ***25*** Seminars for postgraduate (M.Sc. & Ph.D.) students.
- Evaluation of more than ***211*** researche papers a patent for various journals inside and outside Iraq.
- Completion of ***18*** M.Sc. Thesis in the department.
- Completion of ***1*** Ph.D. Discertations in the department.
- Evaluation of ***18*** M.Sc. Thesis (from outside the university).
- Evaluation of ***3*** Ph.D. Discertations (from outside the university).
- Examination of ***50*** M.Sc. students in their Thesis (from inside and outside the university).
- Examination of ***6*** Ph.D. students in their Discertations (from inside and outside the university).
- Supervision of ***38*** M.Sc. students (from inside and outside the university).
- Supervision of ***13*** Ph.D. students (from inside and outside the university).
- Offering about ***40*** consultations to various state offices and ministries and private sector.
- Promoting a number of the teaching staff, ***1*** to the degree of Professor, ***1*** to Assistant Professor and ***4*** to Lecturer.
- One of the faculty staff has been awarded a sabbatical year at Auburn University in USA.
- Participation of a number of faculty staff in training courses inside and outside the country.
- A number of faculty staff contributed in giving continuous learning courses to the engineers of state offices, about course.
- 6 postgraduate students were sent outside the country in research scholarships to finish the experimental part of their work.
- A number of M.Sc. and Ph.D. researches were supported by various state offices and ministries and private sector. The support is either financially (vary rare) or by helping the students in using equipment, materials, analysis devices and others.

D. SWOT Analysis:

This SWOT analysis is written here because it was not included in the previous report.

STRENGTHS (INTERNAL)	WEAKNESSES (INTERNAL)
1. The members of the faculty in the department provide mechanical consultants to state institutions, companies and private sector factories. 2. The contracts with the Governmental Institutes. 3. The ratio of the faculty members to the graduate students is very good. 4. There are an interaction between the faculty and the graduate students through the Seminars held periodically in the Department. 5. A good number of researches of Ph.D. & M.Sc. students and faculty members in the department are studies for real problems and present suggestions and solutions to those problems. 6. Good no. of the researches is published in valuable foreign scientific Journals. **7.** A very wide background of specialties of mechanical engineering exists.	– The lack of a clear plan for scientific research reflects the requirements of the labor market. – The lack of appropriate financial allocations by the Ministry to support the achievement of rigorous scientific research. – The weakness of laboratory infrastructure and poor allocations earmarked for the purchase of modern laboratory equipment. – Lack of joint seminars between the department and public and private institutions which will reflect negatively on research trends. – The small number of joint research with professors from foreign universities. – Spread the misconception that individual is the best research from joint research, which indicates that faculty performance evaluation forms prepared by the ministry for the academic year 2010/2011, which gives weight to the individual research higher than the weight given to the Joint Research
OPPORTINITIES (EXTERNAL)	**THREATS (EXTERNAL)**
1. The MOHEASR sponsored the PhD student's financially to finish part of their research abroad in the International Universities. **2.** The MOHEASR, Research and Development Office sponsored financially faculty and graduate students' researches.	–Because there is no strategy for scientific research, many problems remain in the labor market and new problems will appear unresolved due to lack of or poor coordination between academic institutions and the labor market. –Conduct research not directed correctly so that the go the efforts spent on such research so vain while it can be directed correctly in order to be fruitful research and applicable to solve realistic problemsdo not support the scientific research in universities finantially.