ABET Self-Study Report

for

Aircraft Engineering Program

Mechanical Engineering

Department

2017-2018 Review Cycle

ENGINEERING ACCREDITATION COMMISSION

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Self-Study Report

For the

Aircraft Branch / Mechanical Engineering Department

At

The University of Technology

Baghdad, Iraq

November 2018

to

Engineering Accreditation Commission
ABET, Inc.
111 Market Place, Suite 1050
Baltimore, MD 21202-4012

CONFIDENTIAL

Program Self-Study Report
For
EAC of ABET
Accreditation or Reaccreditation
BACKGROUND INFORMATION

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B. Program History

About University of Technology:

The university started with steady scientific achievements. It was established in 1960 with the idea of establishing an Institute of Industrial Teachers, outlined by the Ministry of Education in cooperation with UNESCO, the founding of the Institute was declared on 22 January 1960, The course of studies was limited to five years after acquiring the high school graduate Certificate, in the subject of Engineering Applications, the first batch was accepted with 45 male students, all of whom were graduates of Industrial Secondary Schools. Since founding, the objectives of the Institute were identified by the need for Engineering Technologists, to work in the industrial sector, with emphasis

on Engineering projects and Applications research labs, it was also charged with the task of preparing teachers to train professionals in the Industrial and Professional trades, aiming to solve the problems of availability of trainers and workers in those trades, and enabling specialists to manage departments and laboratories. The introduction of specialized learning sessions at the institute, was directed through recommendations and instructions of the Presiding Council of the Institute and approved by the Ministry of Education. As founded the Institute included the following sections:

- Department of Materials Engineering
- Department of Mechanical Engineering
- Department of Automotive Engineering
- Department of Electrical Engineering
- Department of Building and Construction Engineering
- Department of Manufacturing Engineering and Assembly

The name of the institute was changed, a few months after its inception, to the Higher Institute of Industrial Engineering, then subsequently renamed after an order by the Ministry of Higher Education, due to its increased importance and to reflect its advancement, and in agreement with UNESCO in 1967, to The Higher College of Industrial Engineering and subsequently amended to the college of Engineering Technology, while simultaneously annexed to the University of Baghdad, Final disengagement of the Faculty from the University of Baghdad, was issued by The decision to establish the University of Technology on 1 April 1975, by a Presidential Decree.

About Mechanical Engineering Department:

The General Mechanical Engineering Program, is an extension of the of Mechanics Department, which was founded with the emergence of the High Industrial Institute in 1960 with the help of the United Nations Educational, Scientific and Cultural Organization (UNESCO), and this Institute then turned to College of Technology Engineering in 1967, and attached to University of Baghdad until the establishment of the University of Technology in 1975, according to the system of the University of Technology, the department is equivalent to the deanery of collage in its administrative structure. The head of the department serves as Dean of the College and his assistants as dean ones and the heads of branches as the heads of departments in counterpart colleges as each branch of The Mechanical Engineer Department is equivalent to department in college at the other universities.

The department is the oldest and the largest scientific departments of the University of Technology which aims primarily to prepare practical engineers in different fields of mechanical engineering at the stage of undergraduate studies and to prepare of advanced cadres in different specifications in post-graduate studies for many graduates. The department also undertook responsibility of contributing in the preparation of moderate cadres that are needed by development plans and developing studies in various and rare fields of mechanical engineering. The department also contributes in the preparation of technical courses and works to send all its technical, administrative and teaching cadres, and to rise their technical, administrative and teaching abilities and levels in sectors of mechanical engineering.

Within the process of Equipment and machines Engineering Department, the educational and scientific process began to develop through the accumulation of experiences taking advantage of the administrative and scientific competencies that gained many of its skills from previous generations, which were keen to the department academically and administratively.

The study in the Department has the nature of application in addition to the theoretical lessons with higher engineering level where the department contains many specialized and acute laboratories; moreover, the practical application in the training center and laboratories at the University of Technology for the Students of equipment and machines Engineering Department will continue during the various stages of the study and this is what qualifies the graduate to be good Technological engineer. The summer training in government directorates and public sector organizations is systematically considered lesson that many of engineering graduation projects for the ended phase is characterized by technological nature. The department takes the initiative to send top students out of the country for study, training and access to the latest technological developments.

The department contains a number of laboratories and engineering workshops to help graduate students in primary and high studies to achieve the practical part of their studies. These laboratories have been developed and updated in recent years in line with the scientific and technological development.

About Aircraft Engineering Branch:

Aeronautic branch established in 1979 and considered one of the important terms of reference in the Department of Mechanical Engineering. Branch specialized features topics covering everything it needed aircraft designs and structures of aircraft engineer, aircraft engines, aviation theory, Aerodynamic and gases, control and stability of the aircraft, electrical and mechanical systems and aircraft maintenance to basic threads of engineering in mechanical engineering.

It contributes to faculty members in the branch to submit their research for publication in scientific journals and participation in local and international conferences on topics aircraft engines, machinery, turbine, structures and aircraft design, Dynamic Fluid transition temperature, vibrations in the plane, and the contribution of many of the faculty members oversee the research of graduate students (MS and PhD). The branch is keen to coordinate scientific and interlock and training with Iraqi Airways to take advantage of the practical side to raise the efficiency of the branch students.

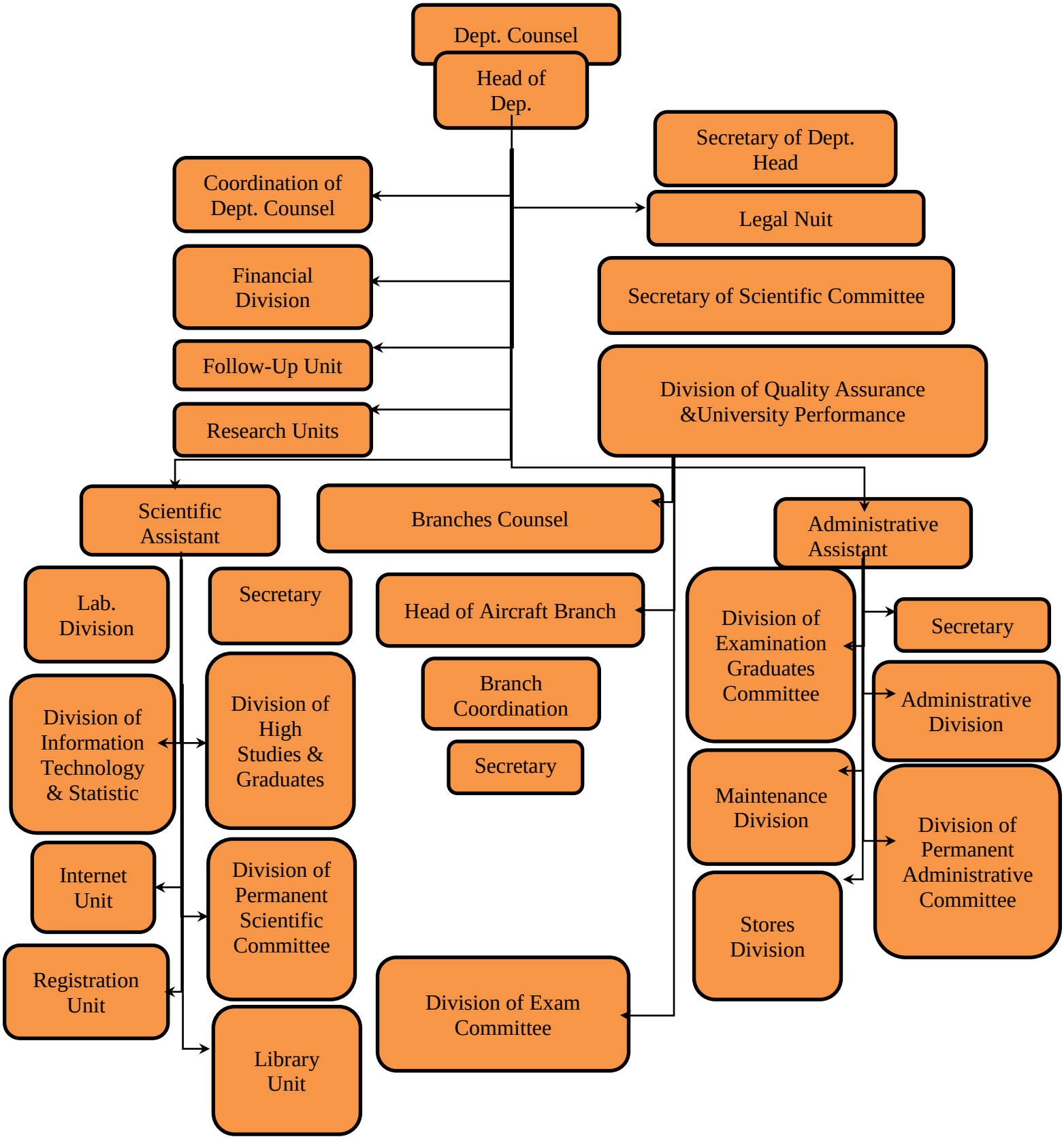
C. Options

The ME program grants only one degree, the Bachelor of Science in Aeronautic Engineering (BSAE).

D. Organizational Structure

Administrative structure from lower to upper administration:

Chair (Aircraft Engineering Branch), Dean (Mechanical Engineering Department, Chancellor (University of Technology). The organization charts for the Branch is as shown as on the following chart.


Dept. Counsel
Head of Dep.
Secretary of Dept. Head
Coordination of Dept. Counsel
Legal Nuit
Financial Division
Secretary of Scientific Committee
Follow-Up Unit
Division of Quality Assurance &University Performance
Research Units
Scientific Assistant
Branches Counsel
Administrative Assistant
Lab. Division
Secretary
Head of Aircraft Branch
Division of Examination Graduates Committee
Secretary
Division of Information Technology & Statistic
Division of High Studies & Graduates
Branch Coordination
Secretary
Administrative Division
Maintenance Division
Division of Permanent Administrative Committee
Internet Unit
Division of Permanent Scientific Committee
Stores Division
Registration Unit
Division of Exam Committee
Library Unit

E. Program Delivery Modes

The program is offered in the day mode only. The program is comprised of on-campus, traditional lecture/laboratory courses. Almost all courses are delivered in the classroom or laboratory except for two: (1) the Professional Experience course in which students are required to work during the summer of the third year at a company that offers professional engineering practice in their field of specialization. The work period covers a minimum of four weeks of full-time work, and (2) the Project courses where students are required to work independently, under the supervision of a faculty member in the program, on a final year project in their field of specialization. In the webpage of the department, faculty members and students can find all courses contents available and free of charge services (downloads, review past exams...etc.). However, no distance education component is available in the program.

F. Program Locations

The program completely offered in the main UOT campus in Baghdad.

G. Public Disclosure

www.uotechnology.edu.iq/dep-mechanicsandequipment/index.htm

H. Deficiencies, Weaknesses or Concerns from Previous Evaluation(s) and the Actions Taken to Address Them

Weaknesses are Observed and included in the improvement plan that are designed for a specific period currently.

Recently there is a five-year plan for substance and subjects itself, to insure keeping up date with the last and modern information on the branch.

CRITERION 1. STUDENTS

A. Student Admissions

The admissions of new students in the Department of Mechanical Engineering / Aircraft Branch at the University of Technology, should meet the following minimum requirements:

1. Holds a high school diploma or equivalent and specialization of scientific or industrial application.
2. Admission to the central department of mechanical engineering and is controlled by the Ministry of Higher Education and Scientific Research.
3. Students are distributed to the engineering departments at the University of Technology, including the Department of Mechanical Engineering and according to plan and absorptive capacity of the department and the average rates of the applicants and their desires. The plan was absorptive capacity of the department in the past five years 150 students.
4. The plan also included the acceptance of outstanding students from technical institutes Foundation, distinguished and employees of state institutions, ministries, and the top 5% of Professional Studies.
5. New students must submit the required documents within a specified period.
6. to be the new student who has graduated from high school system outside of Iraq have completed twelve years of schooling (primary and secondary) from a recognized school. Also required to provide a certificate from the equation and the Iraqi Ministry of Education.

Table (1.1) shows the number and rate of students admitted in the Department of Mechanical Engineering for the past five years.

Table (1.1) Numbers and rates of accepted students for the five years ago.

School year	Acceptance rate		New students No.	Graduates No.
	Minimum average	Moderate average		
2017-2018	90.5	92	29	21
2016-2017	89.6	90	31	20
2015-2016	89.42	90	25	22
2014-2015	89.14	89.71	27	26
2013-2014	86.71	87.92	27	27

B. Evaluating Student Performance

The Evaluation process and assessment measures are as follows:

The evaluation of student performance in each subject by a faculty member. This assessment is different and graded according to the type of material, subject, tasks, and duties and to answer questions. These tasks and duties are usually a combination of tests, exams. Homework and laboratory reports, projects or oral presentations of some of the topics. Moreover, on each student to submit a written report for the final graduation project.

It is followed up by the student evaluation of faculty members and through the examination committee and turn into a final evaluation through final grades at the end of the school year. In addition, it is verified and the results of student assessment and to ensure the validity and eligibility and place it after the academic assessment. Note that the lowest rate is permitted to cross the student is an advanced stage (50%).

As well as (through the non-attendance committee) on a regular basis and follow-up curriculum and vocabulary study and absorbed well and are not repeated absences so as not to exceed the stated percentage allowed (10% of the total number of hours during the year) is the follow-up students' commitment to come to the classroom.

Students who were not able to attend the relevant final examination or fulfill some of the course requirements because of conditions beyond their control can take a second attempt exam. In addition, Students who were not able to attend the relevant second attempt examination because of conditions beyond their control (due to security and violence issues) can take a third attempt exam. If the student fails to get 50% final grade after the third attempt, he/she will be excluded, and the general registration office will close his file as student.

Table (1.2) The Evaluation process and assessment measures

Subject with lab.	Midterm10% + 5% continuous evaluation	Second Midterm 10% + 5% continuous evaluation	10% lab. evaluation	Final Exam 60%	Final Grade 100%
Subject without lab.	Midterm10% + 5% continuous evaluation	Second Midterm 10% + 5% continuous evaluation	N/A	Final Exam 70%	Final Grade 100%
Mechanical Drawing	40% Mechanical Drawing (practical &evaluation)		10% CAD lab.	Mechanical Drawing Final	Final Grade 100%
Project	Discussion 25% + 15% evaluation		N/A	Discussion 35% + 25% evaluation	Final Grade 100%

Table (1.3) Classes and Units Requirements for Graduation

No. of Hours / Week				Unit No.	Class No.	Class Level	
Experimental	Tutorial	Theoretical	Total				
4	13	13	30	33	9	Aircraft	First
4	9	17	30	42	9	Aircraft	Second
6	7	17	30	41	9	Aircraft	Third
5	8	17	30	42	9	Aircraft	Fourth

Table (1.4) Success percentage 1st Attempt to the number of students for the last five academic years.

Table (1.5) Shows the percentage of faculty members and their qualifications for the total number of students for the academic year 2017-2018

Academic Year					Class
2013-2014 Success%/No. Student	2014-2015 Success%/No. Student	2015-2016 Success%/No. Student	2016-2017 Success%/No. Student	2017-2018 Success%/No. Student	
%77/27	%73/27	%76/25	%74/31	%48/29	1st
%73/24	%71/23	%71 /27	%77/30	%41/32	2nd
%76/28	%70/31	%72 /25	%73/27	%45/31	3rd
%71/27	%76/23	%75 /27	%80/21	%77/22	4th

	Faculty Member						Total
	certification		Scientific title				
	Master	Doctoral	Professor	Assistant Prof	Lecturer	Assistant lecturer	
	12	10	1	3	10	8	22
Relative to **114** students of (2017-2018)	10.5%	8.7%	0.7%	2.6%	8.7%	7%	19.2%

C. Transfer Students and Transfer Courses

An applicant who has studied at a recognized institution of higher education may apply for admission as a transfer student. A transfer applicant will not be considered for admission if he or she is on academic probation, suspension, or dismissal from the previous institution. The transfer students' conditions are the followings:

1. The Chancellor of the University has the authority to transfer students (either those who pass or not pass the final exams) except the first and last year students to the corresponding departments and branches in another university according to capacity after obtaining clearance from the original and new university.
2. Students who pass final exams have the right to move to the corresponding colleges, departments, and branches in universities at their geographic regions according to the absorptive capacity after obtaining no objection from the original and new university.
3. Movement between colleges at the same governorate is not allowed.
4. Conduct scientific clearing in according to the applicable roles.
5. The departments of UOT represent colleges, and the transfer between them is central and according to an electronic form.
6. Sons and daughters of scientific titles of the faculty have the right to move between the branches of the colleges.
7. Students in community (private) colleges who are pass the final exams with first grade, and at least have a (very good) grade, have the right to move to the corresponding department in the public universities.
8. Acceptance of foreign students (Iraqi and non-Iraqi) from outside Iraq must be performed by the Ministry of Higher Education and Scientific Researches roles. For more information, visit the link (http://www.dirasat-gate.org)

Transfer student from one department to another in the same discipline. In case of a difference in some subjects matched for subject's analogy. Were for non-analogues being clearing to see what subject the most similarity in the department or choose a subject with a similar curriculum, as well as taking into consideration equal to the units in order to graduate student an investigator full unit.

At some times of disasters or catastrophes, students might have accepted from other colleges for the same subspecialties even with little similarity and for limited time until these conditions removed.

D. Advising and Career Guidance

Committee Educational Guidance: - tasks of this committee represent the following points:

1-A meeting of mentors and faculty members assigned to the guidance on how to provide a safe environment for students, and contribute to modify their behavior

2-Hold a seminar for students in grades first and familiarize them with the functions of the educational guidance and how to deal with the problems they may face and be educated on how to deal with a faculty member, and the style of problem-solving manner true.

3-Develop educational and professional releases that contribute to the benefit of students in the school and the various aspects of life.

4-Participate in field trips for students of the branch to the relevant authorities that serve practically student.

Educational and academic guide consist a large role in the student life of the school, especially when society is under unusual pressure, in each stage be some course lectures they themselves guides educators to those people in that school stage, so they are changing constantly for the students, but they are firm for the stage and the Division for years study , assumed these counselors knowledge of psychology and educational things to be done positive for students, while the leader of academic be lieutenant to students for the duration of his study of the first stage to graduation so that each student has its own file containing personal and family, health and scholarship information, and determines the number of students in this case of (10-15) student, was the relationship between students and their supervisor, academic extended beyond graduation graduate, areas of life process, because the leader is familiar and widely surroundings student of circumstances, this bright image of academic supervisor is still not available. Currently there are no footsteps moving in this area we hope to reach the level of ambition.

E. Work in Lieu of Courses

There are no alternatives for courses that require personal presence and submit assignments, and discussion and participation in the tests and examinations that there is no supplementation of courses such as vocational training and scientific visits and cultural exchanges for students especially graduate students.

F. Graduation Requirements

For the degree of Bachelor of Science in Mechanical Engineering program by the Department of Mechanical Engineering student must comply with the following requirements:

1. Success in school four years, the maximum period allowed for the study (6 years) (and by year of acceptance and in accordance with the regulations and instructions of student window).
2. Pass the summer training successfully.
3. Success and acceptance of the graduation project.

Registration Division of the Department maintains a full file from the academic program and records of graduation and presentation of each student. This file contains all the academic records, correspondence and documents related to the student, including the following:

a. Complete and updated version of the results of the students upon completion of each academic year.
b. A detailed review of the curriculum, which shows the required subjects and detailed categories in detail: mathematics, science, humanities, engineering sciences, and other specialized topics.
c. Copies of all correspondence with the academic nature with the student, including letters of admission to the university.
d. Any exceptions to the rules made by the student and take no action on those exceptions.
e. Any comments or instructions by the head of the department collaborators, including faculty or any other relevant sources of members.

f. The medical reports and the behavior of the student like cheating or others thinks in exams.
g. Wrote punctuation constraint and back seats of study and delay.

Students with the help of their advisors fill out an individual contract sheet that maps the track of courses they need to take in order to graduate. These sheets are updated at the end of each semester when the grades of the courses come out. When students have successfully earned a total of 119 credit hours, advisors report to the faculty the status of their students regarding graduation.

G. Transcripts of Recent Graduates

Republic of Iraq
Ministry of Higher Education
and Scientific Research
University of Technology - Baghdad

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
الجامعة التكنولوجية ـ بغداد

No: العـدد :
Date: التاريخ :

ACADEMIC RECORDS CERTIFICATION

Name :
Date & Place of Birth : - Baghdad
Nationality : Iraqi
First Enrollment : 2009/2010
Department : Mechanical Engineering
Graduation Date : 30/6/2013
Degree : B.Sc. In Mechanical Engineering/Morning study/ Aeronautics
General Average : (%)
Grade :
Rank of Graduation : ( ) Out of ( ) graduates in his specialization for the 1st & 2nd attempts.

Academic Record

First Year	2009-2010	
Subject	Mark	Unit
Mathematics (1)		4
Eng. Drawing & Descriptive		5
Thermodynamics (1)		5
Programming (1)		3
Workshops	Pass	-
Electrical Engineering		5
Properties of Material		4
Mechanics (1)		5
Democracy & Human Rights		2
Passed in 1st attempt ( ) ( )		

Second Year	2010-2011	
Subject	Mark	Unit
Mathematics (2)		4
Mechanical Drawing		4
Mechanics (2)		4
Thermodynamics (2)		5
Fluid Mechanics (1)		5
Strength of Materials		7
Programming (2)		3
Manufacturing Processes		5
Theory of Flight		4
Passed in 1st attempt ( ) ( )		

Third Year	2011-2012	
Subject	Mark	Unit
Engineering &Numerical		5
Theory of Machines		5
Aerodynamics		5
Electrical devices and aircraft		4
Design of Machines		5
Aircraft Engines		5
Heat Transfer		5
Industrial Engineering		4
Gas Dynamics		3
Passed in 2nd attempt ( ) ( )		

Fourth Year	2012-2013	
Subject	Mark	Unit
Aircraft structure		4
Automatic control		5
Technology and propulsion systems,		5
Aircraft designs		6
Aircraft Vibration		5
Stability & Aircraft control		5
Aircraft Systems & Maintenance		5
CAE		4
Project		3
Passed in 1st attempt ( ) ( )		

Prof. Dr. ABDULHASSAN A. KARAMALLAH
Head of Department

Dr. SUDAD ISSAM YOUNIS
University Registrar

Prof. Dr. AMIN DAWAY THAMIR
President of University

Note: 100-90Ex. 89-80V.G. 79-70G 69-60M 59-50Pass

CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

A. *Mission Statement*

Mission Statement of the University of Technology:
Graduate numbers of applied engineers and scientific research cadre efficient and unique level of knowledge and technological innovation to achieve quality assurance and academic accreditation in accordance with the discreet standards universally adopted in engineering and scientific curriculum with a commitment to ethics engineering and scientific

Mission Statement of the Mechanical Engineering Department:
Prepare specialists in the field of mechanical engineering on a distinct level of knowledge and keep abreast of developments in the rapid development in this field and a commitment to professional ethics in work and society field.

Mission Statement of the Aircraft Engineering Branch:

Vision: Aircraft Branch aspires to be one of the best engineering disciplines at the University of Technology and across the country and the world by improving cadre teaching, laboratories, libraries and the tobacco industry's own books value, as well as the development of curricula in line with those requirements in order to be a source for science students. In addition, through the development of a generation of engineers and engineers from the campaign bachelor's degree in engineering sciences including aircraft need approve the community and keep up with scientific and technical development within the jurisdiction of aircraft engineering.

The Message: Developing the study of quantity and quality, in line with the objectives of and essential task to introduction of new paths and channels in preliminary studies and graduate university in line with modern technological developments so-disciplinary research and be consistent with the scientific development and the requirements of the country's labor market depending on the discoveries of successive and accelerated progress of science and technology in all of human life facilities contemporary and activities so that it is the product of the academic program and the graduate student who is the product of high-quality acquired the skill of how to think, analysis and extraction, processing and evaluation.

Also, Developing study quantitatively and qualitatively in accordance with the main objectives of the university which is represented by reproducing of new channels and paths in the undergraduate and postgraduate studies in line with recent technological developments so that the disciplines and research can be conformed with the scientific development and the requirements of the labor market of the country depending on the successive discoveries and rapid progress of science and technology in all fields of contemporary human life, and activities.

B. *Program Educational Objectives*

The objectives of the Mechanical Engineering Department / Aircraft Branch, since its establishment, has come along with the objectives of the University of Technology in delivering its scientific message to the community. The department strategic objectives are represented by:

1. Preparing engineering cadres in various disciplines of Mechanical Engineering (Mechanics Engineering, Air-conditioning and Refrigeration Engineering, Aircraft Engineering and Automotive Engineering) that have a responsibility to build the homeland and to participate in the comprehensive upswing according to the needs of the country as well as preparing educated generation armed with science and adopts it as a sound basis to make radical changes putting into account the scientific knowledge and method in thinking and analysis to serve objectives of the country.
2. Instilling inherent Islamic humanitarian and moral values in the seeds of the new generation and preparing alternative future leaders in the disciplines of mechanical engineering, as well as working to reinforce the status of University of Technology as a creative center of radiation for culture to deepen the inherent social values.
3. Paying more attention to the student in various aspects because they are the product of the department and the university community and the fundamental article of sustainable development through directing them to choose the best means to expand their activities and deepen their professional and scientific specialties within the plan of sustainable development and the needs of the country and the development of their spirit of design, innovation and creativity, regeneration and initiative they have.
4. Working on deepening the balance between the progress of science and the theoretical and practical aspects of them, as well as a focusing on introducing modern methods in the learning system that increase the students' ability to design, creativity and innovation. Upgrading and diversifying Graduate Studies and providing various accessories according to the needs of the country. Working on connecting post graduate studies with current needs of the sustainable development plan for the country and responding them and finding appropriate applied scientific solutions for problems suffered by the industrial sector or developing proposals and controls.
5. Contributing effectively to deepen and strengthen the relationship of the university with the community through the implementation of advisory business, training and development of the administrative and teaching cadres and preparation of specialized courses.

C. Consistency of the Program Educational Objectives with the Mission of the Institution

The process of reviewing and evaluating the educational program of the department / Branch is implemented through the following channels:

1. Studying and evaluating student.
2. Discussing faculty body.
3. Studying and evaluating graduates.
4. Study the advice and the opinion of the labor market (industry).
5. Get sight of similar counterpart experiences in the international and local universities.

D. Program Constituencies

The main constituencies of the Industrial Engineering program are:

- Students
- Faculty

- Staff
- Alumni
- Employers
- Program Advisory Board

The constituencies and their relationships to the program are described below:

1. **Students**: Students have a clear interest in having a broad knowledge of the program related principles, tools, and theories as this prepares them for related careers, and helps them secure jobs locally and abroad. The importance of student engagement is reiterated in student forums discussions, the course surveys and the alumni surveys.
2. **Division members**: Division members strive toward graduating students who are technically capable; have an understanding of the ethical and social dimensions in the program; capable of life-long learning, and who can work in teams. Such traits would elevate the program status and improve its reputation locally, regionally, and internationally. The Division works with course coordinators in order to review courses and ensure that they are aligned with the program outcomes, which in turn contribute to the program's objectives.
3. **Staff members**: The program receives support at the Division, Branch, Departmental and University levels. The personnel provide administrative and technical support. Their tasks include overseeing the up keeping of department, academic, financial, and documents, arranging and sending calls on behalf of the chair for departmental meetings, data collection process for evaluation activities. They also maintain updated student records, personnel, alumni data, and work closely with the Registrar's office to coordinate all program related matters, as well as administering training/internship opportunities for the potential students.
4. **Alumni**: Alumni are clearly influenced by the Branch/Department's reputation, as this would help them advance their careers. They frequently contact faculty for recruitment purposes.

   Finally, the Branch/Department regularly surveys alumni in order to confirm that the objectives are in line with current trends.
5. **Employers**: Employers or industry partners have indicated that they have a clear interest in having students prepared upon entering the workforce. Clearly, the technical and personal preparation of the students is instrumental. Employers are also surveyed to get their feedback and ideas on the state of our graduates and the relevancy of the program's outcomes and objectives.
6. **Program Advisory Board**: This board was composed at first from key graduates and then expanded to include industrial representatives, employers, and recognized alumni members. The advisory board is expected to reiterate the importance of understanding general trends in technology, the ability to pursue life-long learning awareness of quality standards, capability of effectively managing projects, ability to work in teams, possession of high ethical standards, and the possession of good communication skills.

   Referring to the workshops achieved by the Department of Quality Assurance and University Performance and that indicated the necessity to form an Industrial Competencies Council and hold a periodical meeting for the council for at least two sessions a year, and referring to the administrative order no. h m k / 1256 on 7/6/2016 included forming of Industrial Competencies Council (attached hereto), a meeting

was held in the presence of members of the Mechanical Engineering Department and members of the Industrial Competencies Council with hosting the responsible of Quality Assurance and University Performance Section in the department on Wednesday 22/6/2017, and included the following items:

1) Mr. Head of department welcomed the attendants in the Department of Mechanical Engineering place presenting them the thanks and appreciation for accepting the invitation in the days of Ramadan month, wishing all acceptable fasting. Then, he turned to the ambition of University of Technology for entering the reliability by meeting the requirements of ABET, where he referred to the existence of a department concerns with the quality, known as Quality Assurance and University Performance, and from this department, a special section for quality assurance and university performance emerges in each department of the University of Technology. And for the purpose of achieving these requirements, a correlation between the theoretical output in the department and the industrial sector should be performed, for which this council is emerged.

2) The responsible of Quality Assurance and University Performance Section displayed the extracted data from the work of the section for all department branches, represented by the General Mechanical Engineering Branch, Air-conditioning and Refrigeration Engineering Branch, Automotive Engineering Branch, Aircrafts Engineering Branch and Power Plants Engineering Branch. He also exhibited through them the objectives of each scientific branch and the desire to shortcut these goals and refine them in line with the requirements of ABET, referring to the University of Missouri's experiment in this area.

3) In light of the displayed data, a discussion has been opened on the subject with the participation of all attendants.

4) The discussion outcome viewpoints distributed between the academic side and the industrial sector which pointed out clearly the importance of formation of this council being considered as a link between the educational and industrial sectors, and because it has a positive impact in giving the moral momentum to dear students.

5) Most of the attendants expressed their willingness to provide support to achieve the goals of scientific branches through their readiness to submit projects that include real industrial problems to study them as graduation projects for the fourth stage as a first step with the importance of organizing scientific trips to the industrial sector enhancing the student's self-confidence and his knowledge by application.

6) Forms were distributed to the members of the council and the required information were fixed in the form such that the communication should be done through the websites for the success of this experiment, which is considered by many of them a successful step that needs more support and cooperation to consolidate it.

7) Mr. Head of department presented on behalf of the department council, the employees of the department and the presidency of the University of Technology the thanks and appreciation to all attendants, wishing them continual progress and prosperity.

E. Process for Review of the Program Educational Objectives

It was discussed once in the general assembly meeting by Mechanical Engineering Branch / Department Council.

CRITERION 3. STUDENT OUTCOMES

A. Student Outcomes

First Class	
Program Outcome	**Courses**
Outcome A: Apply knowledge of mathematics, science and engineering	5
Outcome B: Design and conduct experiments	3
Outcome C: Design a system, component, or process within realistic constraints	2
Outcome D: Function on multidisciplinary teams	1
Outcome E: Identify, formulate, and solve engineering problems	6
Outcome F: Understanding of professional and ethical responsibility	2
Outcome G: Communicate effectively	1
Outcome H: Impact of engineering solutions in a global and societal context	1
Outcome I: Lifelong learning	4
Outcome J: Contemporary issues	2
Outcome K: Use the techniques, skills, and modern engineering tools for engineering practice	6

Second Class	
Program Outcome	**Courses**
Outcome A: Apply knowledge of mathematics, science and engineering	9
Outcome B: Design and conduct experiments	6
Outcome C: Design a system, component, or process within realistic constraints	5
Outcome D: Function on multidisciplinary teams	1
Outcome E: Identify, formulate, and solve engineering problems	5
Outcome F: Understanding of professional and ethical responsibility	2
Outcome G: Communicate effectively	2
Outcome H: Impact of engineering solutions in a global and societal context	1
Outcome I: Lifelong learning	7
Outcome J: Contemporary issues	4
Outcome K: Use the techniques, skills, and modern engineering tools for engineering practice	7

Third Class	
Program Outcome	**Courses**
Outcome A: Apply knowledge of mathematics, science and engineering	6
Outcome B: Design and conduct experiments	8
Outcome C: Design a system, component, or process within realistic constraints	2
Outcome D: Function on multidisciplinary teams	1
Outcome E: Identify, formulate, and solve engineering problems	7
Outcome F: Understanding of professional and ethical responsibility	1
Outcome G: Communicate effectively	5
Outcome H: Impact of engineering solutions in a global and societal context	1
Outcome I: Lifelong learning	4
Outcome J: Contemporary issues	7
Outcome K: Use the techniques, skills, and modern engineering tools for engineering practice	5

Fourth Class	
Program Outcome	**Courses**
Outcome A: Apply knowledge of mathematics, science and engineering	9
Outcome B: Design and conduct experiments	7
Outcome C: Design a system, component, or process within realistic constraints	8
Outcome D: Function on multidisciplinary teams	2
Outcome E: Identify, formulate, and solve engineering problems	6
Outcome F: Understanding of professional and ethical responsibility	2
Outcome G: Communicate effectively	6
Outcome H: Impact of engineering solutions in a global and societal context	1
Outcome I: Lifelong learning	5
Outcome J: Contemporary issues	6
Outcome K: Use the techniques, skills, and modern engineering tools for engineering practice	9

Figure 3.1 Students Outcomes Assessments for Aircraft Engineering Program 2017-2018

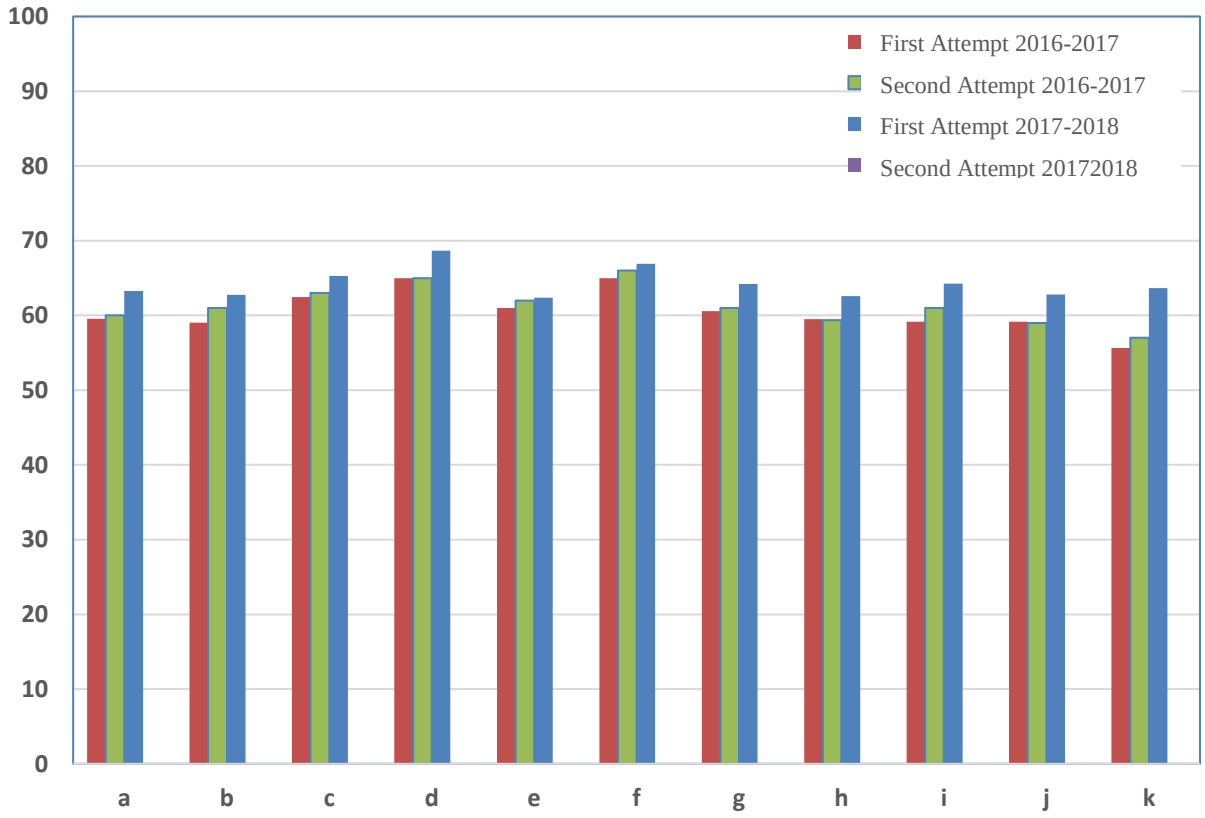


Figure 3.2 Aircraft Engineering Branch Alumni Servey for Student Ooutcomes

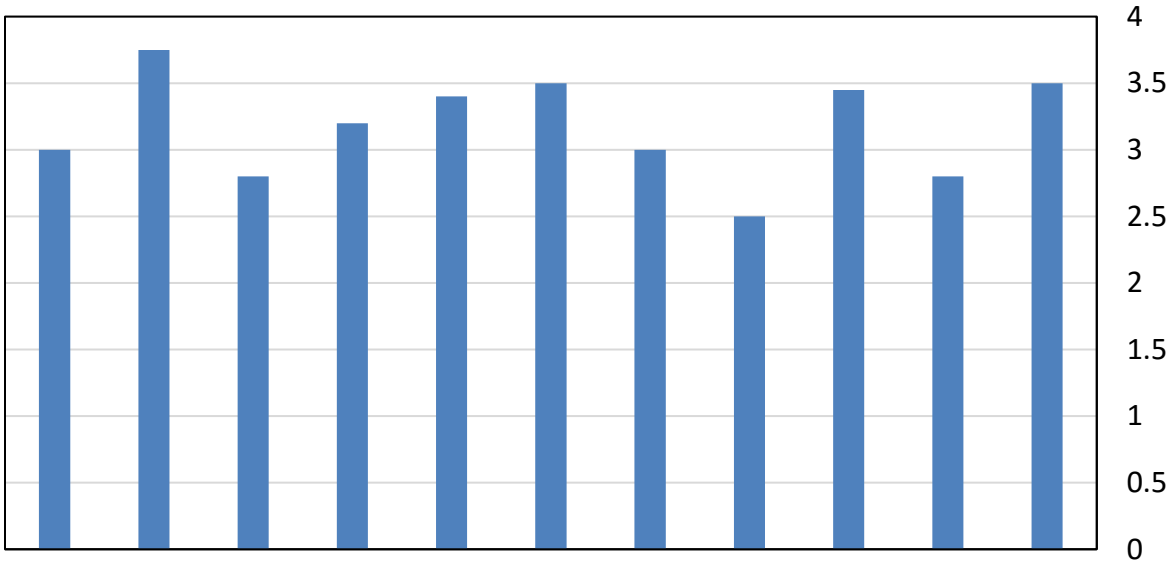
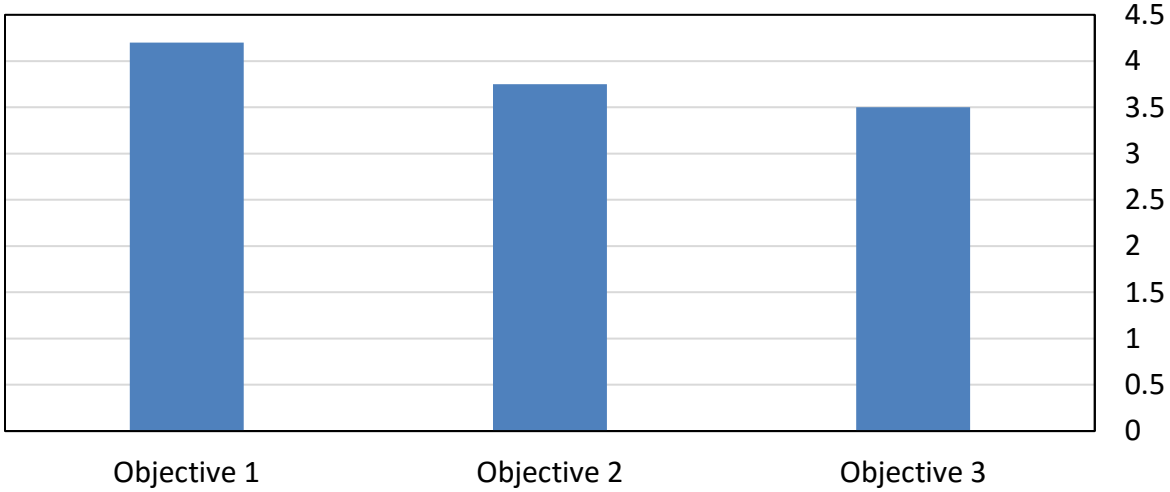


Figure 3.3 Aircraft Engineering Branch Alumni Servey for Program Objectives



B. Relationship of Student Outcomes to Program Educational Objectives

The achievement of the Student Outcomes ensures that our graduates are well equipped to achieve the Program Educational Objectives in actual practice following graduation. The linkage between the individual Program Educational Objective (PEOs) and the Student Outcomes (SOs) is shown below in Table 3-1 and their relationships are briefly described as follows:

The educational objectives of the undergraduate program in EREE are to produce graduates who (within a few years of graduation):

1. Successfully practice the mechanical engineering disciplines;

2. Contribute to society and the profession;

3. Engage in life- long learning to advance professionally through continuing education and training;

4. Succeed in graduate studies in mechanical engineering or a related field if pursued.

PEO #1 states the successful practice as a mechanical engineer. Achievement of the Student Outcomes a, b, c, d, e, g and k ensures that our graduates are adequately equipped with the minimum level of knowledge and skills required for the practice.

PEO #2 emphasizes the service and responsibility as an engineer. Achievement of the Student Outcomes f, h and j will equip our graduates with the required ability.

PEO #3 stresses the need for life- long learning throughout their career. Achievement of the Student Outcomes a, h, i and j will ensure the required ability.

PEO #4 states that our graduates will be successful in the graduate study and the achievement of the Student Outcomes a-k makes the base for the success.

To assure that our graduates have achieved the Student Outcomes, the curriculum must contribute for achievement of each Student Outcome collectively. As all the Student Outcomes are addressed within the core curriculum, students of the Aircraft Engineering Branch AEB Program will be trained to achieve the Student Outcomes throughout the coursework. The ABET syllabi for the required courses are contained in the Appendix B. Each syllabus describes a weighted correlation of the course to the Student Outcomes as presented in Table 3-2.

Table 3-1 Mapping of Program Educational Objectives to Student Outcomes

PEOs	Student Outcomes (SOs)										
	a	b	c	d	e	f	g	h	i	j	k
PEO #1	X	X	X	X	X		X				X
PEO #2						X		X		X	
PEO #3	X							X	X	X	
PEO #4	X	X	X	X	X	X	X	X	X	X	X

Table (3.2) represents the relationship between the topics curriculum of the branch of aircraft and standards Engineering (ABET), which was given a low-grade (L) and medium (M) or high (H) according to the weight of each of the standards ABET.

Table (3.2) The relationship between the topics curriculum of the branch of aircraft and standards Engineering (ABET)

ABET Criteria for Engineering Technology											Educational Objectives	
K	J	I	H	G	F	E	D	C	B	A	Object Name	Object Code
	L	L			M						Human Rights & Democracy	111/ME/1
M						M		H			Programming I	122/ME/1
						M				H	Mathematics I	123/ME/1
H			L								Eng. Drawing &Descriptive	134/ME/1
				M	H		M				Workshops	145/ME/1
L		M				M			M	M	Thermodynamics I	136/ME/1
L		M				H			M	M	Mechanics I	137/ME/1
L	L					M		M		M	Properties of Material	138/ME/1
L		L				M			M	M	Electrical Engineering	139/ME/1
2nd Class												
L	M		L		M			M	L	M	Theory of Flight	281/ME/2
		L								H	Programming II	222/ME/2
						H				H	Mathematics II	223/ME/2
H		L		M			L	H		M	Mechanical Drawing	234/ME/2

L	**L**	**L**		**L**				**M**	**M**	**M**	Strength of Materials	245/ME/2
L		**L**				**M**			**M**	**M**	Thermodynamics II	236/ME/2
L	**M**	**L**				**L**		**L**	**M**	**M**	Mechanics II	237/ME/2
M	**M**	**L**			**H**	**L**		**M**	**M**	**M**	Manufacturing Processes	238/ME/2
L		**L**				**M**			**M**	**M**	Fluid Mechanics I	249/ME/2
3rd Class												
	L	**L**		**L**	**M**	**M**					Industrial Engineering	319/ME/3
M						**H**			**H**	**H**	Engineering & Numerical Analysis	321/ME/3
	L			**L**					**M**	**M**	Gas Dynamics	388/ME/3
	L	**L**	**L**			**M**			**M**	**M**	Aircraft Engines	384/ME/3
M	**L**					**H**			**M**	**H**	Theory of Machines	342/ME/3
H		**L**		**H**		**H**	**H**	**H**	**H**		Machine Design II	354/ME/3
	L					**M**			**H**	**H**	Heat Transfer	345/ME/3
L	**L**			**L**		**H**		**M**	**H**	**H**	Aerodynamics	386/ME/3
L	**L**	**L**		**L**					**M**		Aircraft Electricity and Instruments	387/ME/3
4th Class												
L	**L**	**L**		**L**		**M**		**M**	**H**	**M**	Aircraft Structures	481/ME/4
M	**L**			**L**		**M**		**M**		**M**	Automatic Control	432/ME/4
M	**M**	**L**			**L**			**M**	**M**	**M**	Aircraft Engine and Jet Propulsion	483/ME/4
L	**L**	**L**						**M**	**M**	**M**	Designs of Aircraft	484/ME/4
L				**L**		**H**			**H**	**H**	Aircraft Vibration	485/ME/4
M	**L**			**L**		**M**		**M**		**M**	Aircraft Stability and control	486/ME/4
L	**L**	**L**	**L**					**M**	**H**	**M**	Aircraft Systems and Maintenance	487/ME/4
L		**M**		**H**	**H**	**H**	**H**	**H**	**H**	**H**	Project	448/ME/4
H				**M**		**H**	**H**	**H**	**M**	**M**	Computer Added Engineering	429/ME/4

Table (3.3) The relationship between the Objective of the branch of aircraft and standards Engineering (ABET)

Program Outcome	1st Class	2nd Class	3rd Class	4th Class
Outcome A: Apply knowledge of mathematics, science and engineering	5	9	6	9
Outcome B: Design and +8conduct experiments	3	6	8	7
Outcome C: Design a system, component, or process within realistic constraints	2	5	2	8
Outcome D: Function on multidisciplinary teams	1	1	1	2
Outcome E: Identify, formulate, and solve engineering problems	6	5	7	6
Outcome F: Understanding of professional and ethical responsibility	2	2	1	2
Outcome G: Communicate effectively	1	2	5	6
Outcome H: Impact of engineering solutions in a global and societal context	1	1	1	1
Outcome I: Lifelong learning	4	7	4	5
Outcome J: Contemporary issues	2	4	7	6
Outcome K: Use the techniques, skills, and modern engineering tools for engineering practice	6	7	5	9

CRITERION 4. CONTINUOUS IMPROVEMENT

Assessment is defined as one or more processes that identify, collect, and prepare the data necessary for evaluation. Evaluation is defined as one or more processes for interpreting the data acquired though the assessment processes in order to determine how well the student outcomes are being attained.

The most important basic duties and functions of the Department of Mechanical Engineering for continuous improvement of the educational program are:

Continuous improvement of the educational program in the Department of Mechanical Engineering be sustained through the Scientific Committee and specialized committees branching from it. Are listed or proposed revisions to the curriculum of the committees referred to corrective action and of all faculty members in the meetings of the General Authority after discussion, review, and approval.

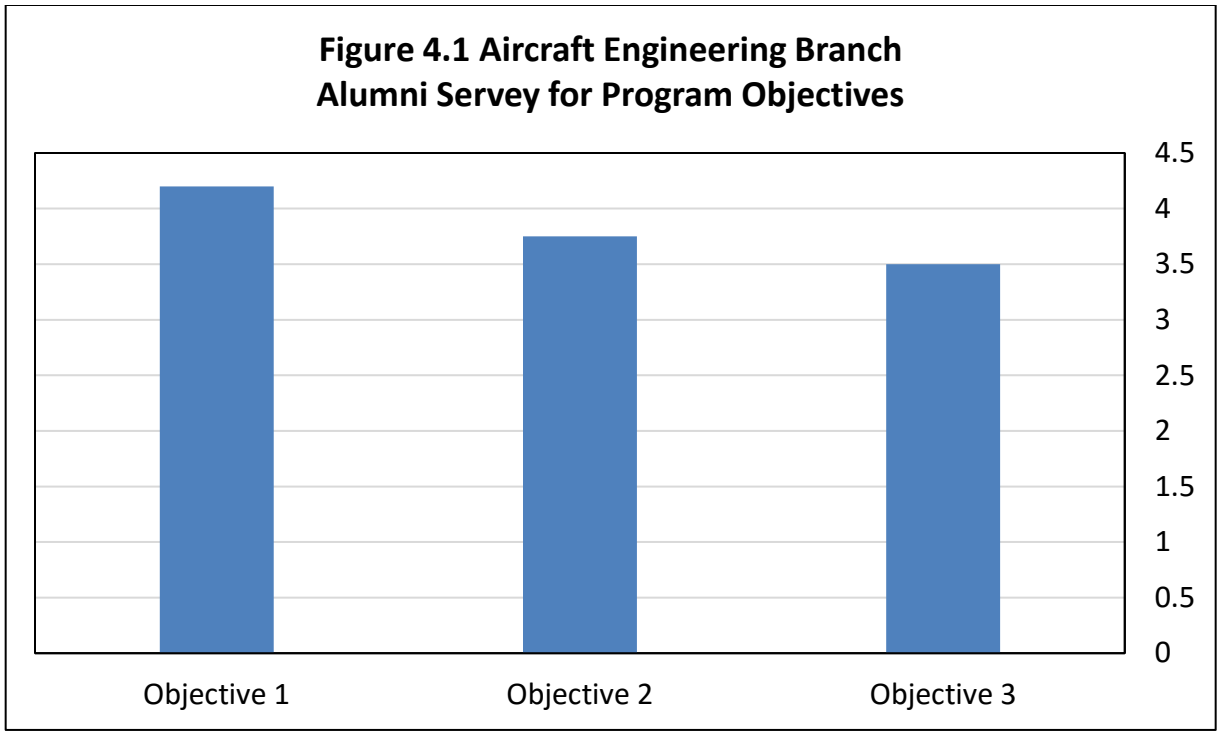
Since the academic year (2008-2009) was the adoption of a comprehensive change of the items of the curriculum of the Department of Mechanical Engineering after evaluating general and comprehensive of the old curriculum and review and give wider powers to faculty members to update the scientific curriculum and (15%) for each academic year.

The focus in our branch and periodically on continuous improvement, the section is always trying to improve the scientific and administrative process and overcome all difficulties and obstacles that hinder the tutorial. We are working on the analysis of the deficit and put the right solutions to achieve satisfactory results.

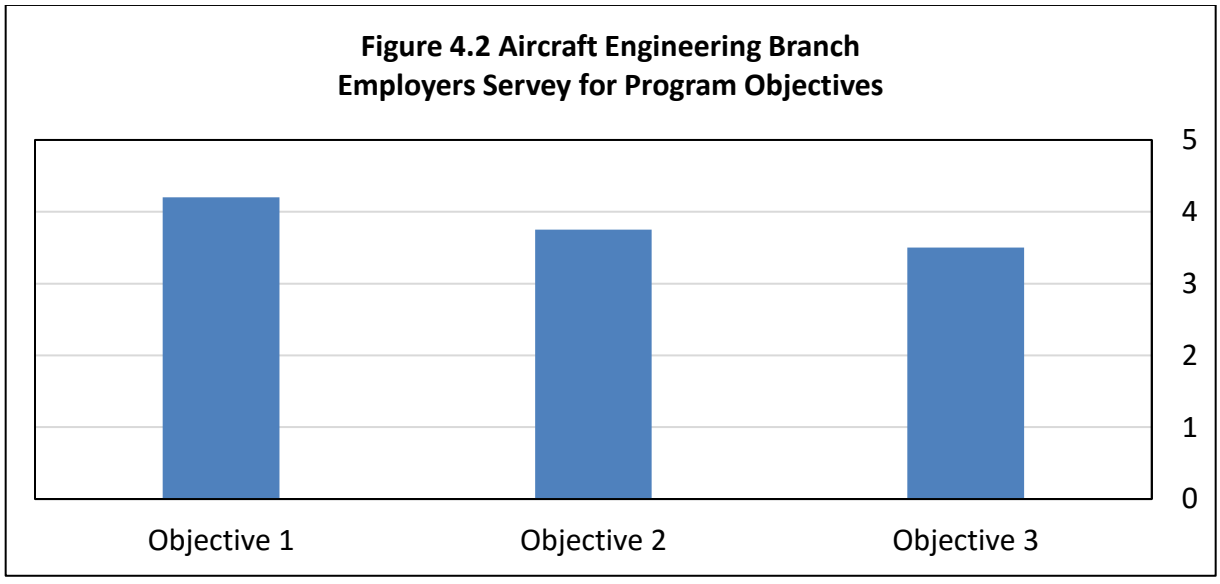
The following describes the steps implemented or are in the process of implementation:

1. Continuous comprehensive renovations in the curriculum of the branch and on an annual basis since the academic year 2010-2011.
2. Continuous development of faculty members of the branch through communication with modern information.
3. Encourage faculty members of the branch to get the highest scientific and administrative ranks.
4. Provide modern software specialized in aircraft engineering.
5. Increase in extra-curricular activities for students such as branch visit Baghdad airport and the Air Force and the establishment of scientific conferences and symposia, sports and personal creations.

For the 2016-2017 alumni survey, alumni who graduated between 2011 and 2017 were contacted by meeting inside the department and they were requested to fill out the survey form and a total of 10 alumni responded. In the survey, the alumni were asked how competent they feel now on our PEOs (Ratings: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree) based on the education and training they received from our undergraduate program. Many of them replied with 4 or 5 for each PEO. The survey results with the average scores for each PEO are shown in Figure 4.1.



The survey results were discussed at the AEB faculty meetings during the May 2017. It was noted that the top two suggestions from our alumni for improvement of our program were "more real-world experience" and "better communication skills". The faculty members will ask to consider more real-world problems in their teaching materials in annual meeting September 2017. For the employer survey, approximately 9 employers responded. The employer survey consisted of two sections. In the section 1, the employers were asked to rate our PEOs (Ratings: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Fig. 4.2 shows the results of the 2015-2016 survey with the average scores for each PEO. The results indicated that our graduates were comparable to the engineers from other schools



Our PEOs were revised at the end of 2016-2017 PEOs by our constituents. The PEOs were assessed and evaluated through the alumni and employer surveys during the 2016-2017. The revised PEOs are listed below. The educational objectives of the undergraduate program in Aircraft Engineering are to produce graduates who (within a few years of graduation):

1. Successfully practice the aeronautics engineering disciplines;
2. Contribute to society and the profession;
3. Engage in life- long learning to advance professionally through continuing education and training;
4. Succeed in graduate studies in aircraft engineering or a related field if pursued.

A. Student Outcomes

The assessment methods for the Student Outcomes (SOs) include Course Assessment and SOs surveys at the Exit Interview and Alumni. The assessment data collected during each academic year are analyzed during the following summer. The assessment results and actions for improvement are discussed at the beginning of the annually faculty meeting in September. The AEB ABET Coordinator oversees all the assessment process while the AEB Undergraduate Committee discuss the assessment results and recommend the possible actions for improvement to the AEB faculty. The two assessment methods for the assessment and evaluation of Student Outcomes (SOs) are briefly described below.

1. **Course Assessment:** Table (4.1) illustrates which SOs are addressed by the required AEB courses. The SOs are assessed through the assessment of the outcome-related from various courses collectively. Our primary goal is to distribute the coverage of each SO throughout the program so that our curriculum could provide repeated practice and feedback in the knowledge and skills the students need to achieve. To assure that our graduates have achieved the SOs, the curriculum must contribute for achievement of each SO collectively. As all the SOs are addressed within the core AEB courses, our students will be trained to achieve the SOs. The assessment results for the 2016-2017 and 2017-2018 course assessments are summarized below in Tables (4.2), the formally pass grade is 50% for all courses, and this was set by Ministry. All courses average was passed 50%. In our system, the students have two attempts, one in June and the second in September. If they fail in first attempt, they have the right to have second attempt. Figure (4.3) shows the results of the two attempts for 2016-2017, where all student outcomes pass 60% in the second attempt. Figure (4.4) shows the results of first attempt for 2017-2018. Student work samples were collected as a part of the course assessment and they will be available for review.

Table (4.1) Contribution of Required Courses to Student Outcomes

ABET Criteria for Engineering Technology											Educational Objectives	
K	J	I	H	G	F	E	D	C	B	A	Object Name	Object Code
	*	*			*						Human Rights & Democracy	111/ME/1
*						*		*			Programming I	122/ME/1
						*				*	Mathematics I	123/ME/1
*			*								Eng. Drawing &Descriptive	134/ME/1
				*	*		*				Workshops	145/ME/1
*		*				*			*	*	Thermodynamics I	136/ME/1
*		*				*			*	*	Mechanics I	137/ME/1
*	*					*		*		*	Properties of Material	138/ME/1
*		*				*			*	*	Electrical Engineering	139/ME/1
2nd Class												
*	*		*		*			*	*	*	Theory of Flight	281/ME/2
		*								*	Programming II	222/ME/2
						*				*	Mathematics II	223/ME/2
*		*		*			*	*		*	Mechanical Drawing	234/ME/2
*	*	*		*				*	*	*	Strength of Materials	245/ME/2
*		*				*			*	*	Thermodynamics II	236/ME/2
*	*	*				*		*	*	*	Mechanics II	237/ME/2
*	*	*			*	*		*	*	*	Manufacturing Processes	238/ME/2
*		*				*			*	*	Fluid Mechanics I	249/ME/2
3rd Class												
	*	*		*	*	*					Industrial Engineering	319/ME/3
*						*			*	*	Engineering & Numerical Analysis	321/ME/3
	*			*					*	*	Gas Dynamics	388/ME/3
	*	*	*			*			*	*	Aircraft Engines	384/ME/3
*	*					*			*	*	Theory of Machines	342/ME/3
*		*		*		*	*	*	*		Machine Design II	354/ME/3
	*					*			*	*	Heat Transfer	345/ME/3
*	*			*		*		*	*	*	Aerodynamics	386/ME/3
*	*	*		*					*		Aircraft Electricity and Instruments	387/ME/3

4th Class												
*	*	*		*		*		*	*	*	Aircraft Structures	481/ME/4
*	*			*		*		*		*	Automatic Control	432/ME/4
*	*	*			*			*	*	*	Aircraft Engine and Jet Propulsion	483/ME/4
*	*	*						*	*	*	Designs of Aircraft	484/ME/4
*				*		*			*	*	Aircraft Vibration	485/ME/4
*	*			*		*		*		*	Aircraft Stability and control	486/ME/4
*	*	*	*					*	*	*	Aircraft Systems and Maintenance	487/ME/4
*		*		*	*	*	*	*	*	*	Project	448/ME/4
*				*		*	*	*	*	*	Computer Added Engineering	429/ME/4

Table 4.2 Summary of Courses Performance

Grades of 2017-2018		Grades of 2016-2017		Educational Objectives	
2nd Attempt	1st Attempt	2nd Attempt	1st Attempt	Object Name	Object Code
70	71	53	66	Human Rights & Democracy	111/ME/1
62	66	49	62	Programming I	122/ME/1
62	66	59	58	Mathematics I	123/ME/1
61	64	4	62	Eng. Drawing &Descriptive	134/ME/1
71	71	71	71	Workshops	145/ME/1
59	63	4	59	Thermodynamics I	136/ME/1
61	66	47	59	Mechanics I	137/ME/1
63	68	59	66	Properties of Material	138/ME/1
59	62	56	60	Electrical Engineering	139/ME/1
2nd Class					
65	69	52	63	Theory of Flight	281/ME/2
61	66	50	54	Programming II	222/ME/2
60	65	50	58	Mathematics II	223/ME/2
68	73	51	56	Mechanical Drawing	234/ME/2
65	73	47	60	Strength of Materials	245/ME/2
61	67	52	57	Thermodynamics II	236/ME/2
61	66	49	53	Mechanics II	237/ME/2
66	68	57	63	Manufacturing Processes	238/ME/2
61	66	49	56	Fluid Mechanics I	249/ME/2
3rd Class					
58	59	55	55	Engineering & Numerical Analysis	323/ME/3

55	59	46	52	Theory of Machines	342/ME/3
56	59	52	51	Machine Design II	354/ME/3
57	59	61	57	Aircraft Engines	384/ME/3
57	60	50	57	Heat Transfer	345/ME/3
54	54	52	48	Aerodynamics	386/ME/3
62	65	57	53	Aircraft Electricity and Instruments	387/ME/3
55	35	49	50	Gas Dynamics	388/ME/3
58	62	60	52	Industrial Engineering	319/ME/3
4th Class					
64	67	62	59	Aircraft Structures	481/ME/4
64	67	53	69	Automatic Control	432/ME/4
60	63	68	63	Aircraft Engine and Jet Propulsion	483/ME/4
64	68	42	63	Designs of Aircraft	484/ME/4
59	62	54	62	Aircraft Vibration	485/ME/4
66	68	44	59	Aircraft Stability and control	486/ME/4
80	82	74	74	Aircraft Systems and Maintenance	487/ME/4
85	85	84	84	Project	448/ME/4
65	66	41	74	Computer Added Engineering	429/ME/4

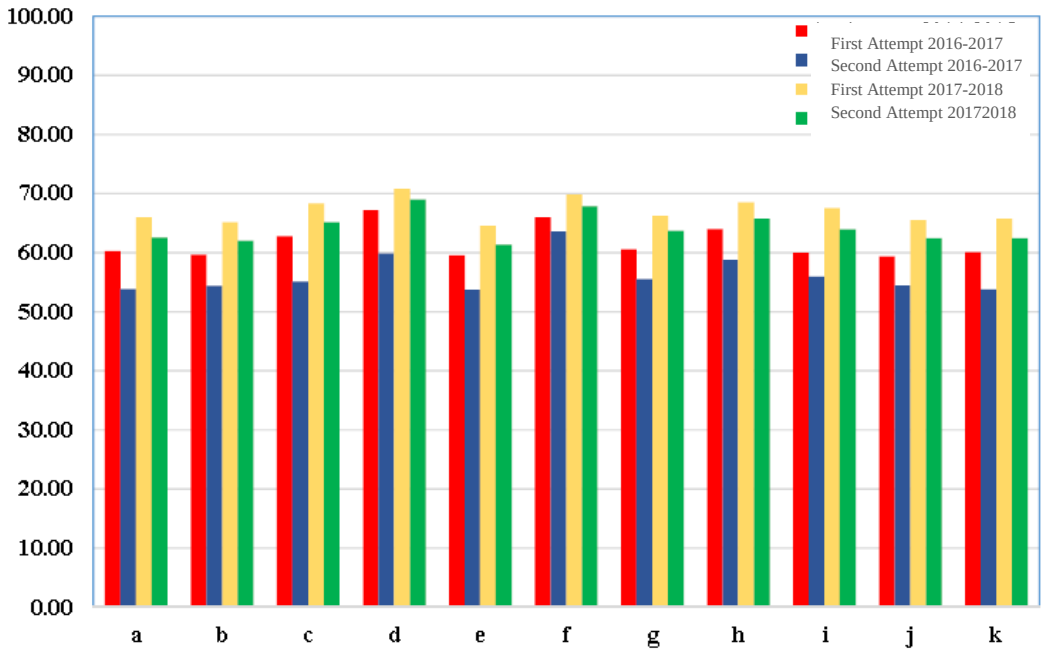


Fig. 4.3 Student outcomes performance through courses for first and second attempts for 2017-2018

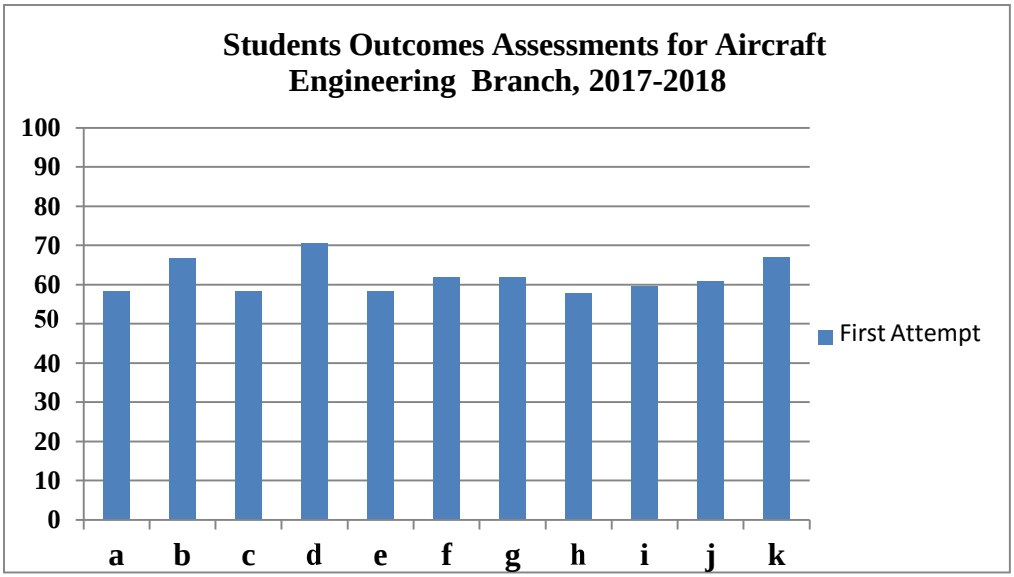


Figure. 4.4 Student outcomes performance through courses for first attempt for 2017-2018

2. The Final year students meet with the Department Chair and Dean at May. As a part of the exit interview, a survey is conducted for the assessment of Student Outcomes. In the survey, the graduating seniors were asked how competent they feel in the areas of the Student Outcomes (Ratings: 1= Disagree Strongly, 2 = Disagree Somewhat, 3 = Agree Somewhat, 4 = Agree Strongly) based on the education and training they received through the AEB undergraduate program. Figure 4.5 shows the results of the survey with the average scores for each Student Outcome for 2017-2018.

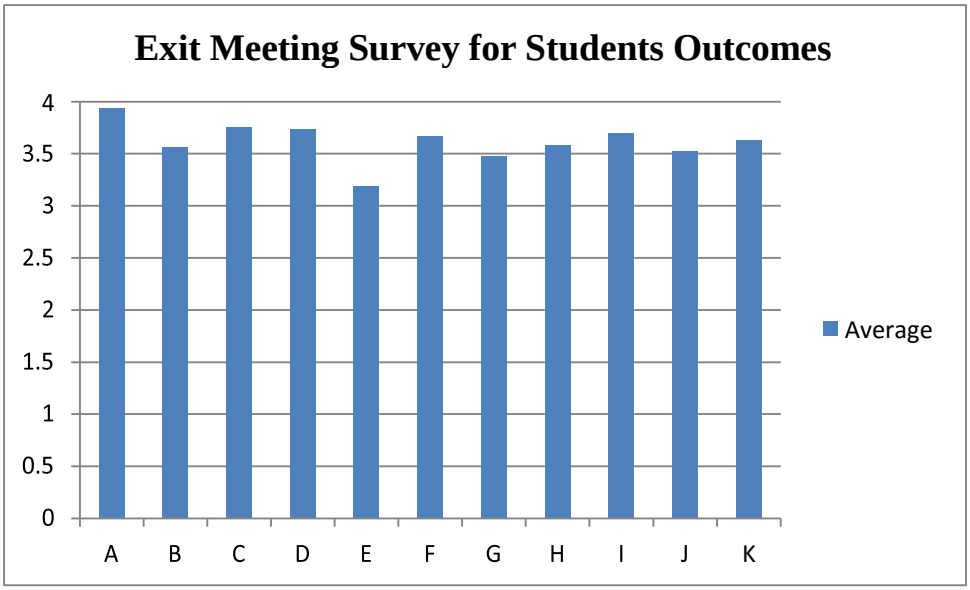


Figure. 4.5 Exit interview survey for student outcomes

3. The Alumni meet with the Department Chair and Dean at May. A survey is conducted for the assessment of Student Outcomes. In the survey, the alumni were asked how competent they feel in the areas of the Student Outcomes (Ratings: 1= Disagree Strongly, 2 = Disagree Somewhat, 3 = Agree Somewhat, 4 = Agree Strongly) based on the education and training they received through the AEB undergraduate program. Figure 4.6 shows the results of the survey with the average scores for each Student Outcome for 2017- 2018.

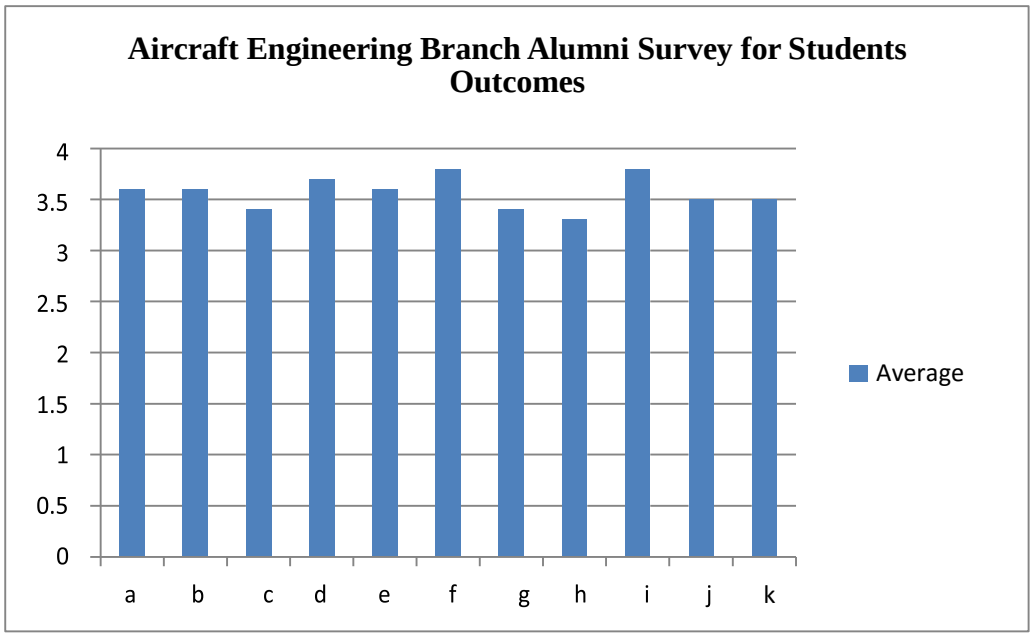


Figure. 4.6 Alumni survey for student outcomes

Table (4.3) represents the results of Aircraft Branch student for the last five academic years at the final year of graduation. While Table (4.4) represents the listing and description of the assessment results of Aircraft Branch student for the last five academic years at the final year of graduation. Each lesson should follow the distribution of grades in according to the section system, also according to the case of the lesson if there is a laboratory with it, or how its applied in the lesson side. The Table (4.5) shows that the division of grades according to the case of the subject.

Table (4.3) The results of Aircraft Branch student for the last five academic years at the final year of graduation

Student Condition	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Student No.	25	27	22	27	22
1st Attempt	15	22	13	13	17
2nd Attempt	10	5	9	14	5

Table (4.4) The listing and description of the assessment results of Aircraft Branch student for the last five academic years at the final year of graduation

Academic Year	Very Good 80 - 89	Good 70 - 79	Medium 60 - 69	Accepted 50 - 59
2017-2018	2	2	7	11
2016-2017	1	4	8	12
2015-2016	-	3	6	13
2014-2015	-	2	10	14
2013-2014	-	1	8	18

Table (4.5) The Annual Grade Before Final Exam for the Aircraft Branch

Aircraft Class	Annual Grade Before Final Exam		
	Subjects of 50 Degree	**Subjects of 60 Degree**	**Subjects of 70 Degree**
1st Year Class	• Programming I • Workshops • Eng. Drawing & Descriptive Geometry • Human Rights & Democracy	• Mathematics I • Electrical Engineering • Thermodynamics I • Mechanics I • Properties of Material	• Mathematics I
2nd Year Class	• Programming II • Mechanical Drawing	• Thermodynamics II • Strength of Materials • Fluid Mechanics I • Thermodynamics II • Mechanics II • Manufacturing Processes	• Mathematics II • Theory of Flight
3rd Year Class	• Mechanical • Engineering Design	• Aerodynamics • Engineering and Numerical Analysis • Gas Dynamics • Theory of Machines • Heat Transfer • Aircraft Engines • Aircraft Electricity and Instruments	• Industrial Engineering
4th Year Class	• Designs of Aircraft • Computer Added Engineering • Aircraft Structures	• Aircraft Propulsion Systems • Technology and Design • Aircraft Vibration • Aircraft Systems and Maintenance • Automatic control	• Project
	•	•	•

B. Continuous Improvement

Program Improvement by Assessment of Program Educational Objectives

To measure the level of achievement of the Program Educational Objectives (PEOs) by our graduates, the feedbacks from the alumni and employers of our graduates are utilized through the surveys. Both alumni survey and the employer survey were conducted in May at end of 2017-2018. The results showed that our graduates in average have achieved the PEOs and our graduates were comparable to the engineers from other schools as described in the previous section. The survey results were discussed at the AEB faculty meetings and no action was taken for improvement of our program at this time. We have also received many comments and suggestions from our alumni and employers. At this time, the feedbacks on the two of most common subjects such as "more real-world experience" and "better communication skills" were further discussed at the faculty meeting. Even though no action was taken for improvement of our program, it was suggested that the faculty should try to use more practical class examples and problems closely related to real world and to include more writing assignments and chance of oral presentation in each course schedule.

Program Improvement by Assessment of Student Outcomes

To measure the level of achievement of the Student Outcomes (SOs) by our students before their graduation, two assessment methods are being utilized including Course Assessment and SOs survey (Exit Interview and Alumni surveys) as described in the previous section. The assessment data are collected during the 2016-2017 and 2017-2018 for courses assessment and 2017-2018 for surveys. The data will analyze by the AEB ABET coordinator during summer. Then, the assessment results are reviewed by the AEB Undergraduate Committee to recommend possible actions for improvement to the AEB faculty at September faculty meetings.

To keep update with scientific development in the modernization of the global vocabulary curricula of universities are the University of Technology in the re-evaluation of all the curriculum for all disciplines at the University for each Course (every four years) and is applied under the chronology for each session. In fulfillment of that, it was to instruct the Scientific Committee in the department to study the updated curriculum.

The Scientific Committee in the section the following actions:

1. Was formed specialized committees of the employees of the department headed by an expert in the field of specialties where guidance has been accessing to the old curriculum and curriculum comparable information available on the global network of universities and professors through specialists have been identified and additions to delete some of the topics that have been developed.
2. It has been the formation of committees of the heads of branches and heads of committees to re-evaluate the studies, according to terms of reference.
3. Was approved curriculum after the update by the Scientific Committee in the section included the following:
    i. First. Update rate ranged from 5% to 70% of an average of more than 30% for all disciplines.
    ii. Second. It has some of the material transfers between stages that do not affect the performance of the process of teaching and units.

C. Additional Information

Summer Training:

One of the requirements for obtaining a bachelor's degree in mechanical engineering is complete the students to sixty days of summer training in the corporate sector or the government sector, and this training is a mandatory component of the graduation requirements, and be under the auspices of the summer training in the section,

Graduation Project:

The graduation of a student completing the final phase requirements (fourth) Graduation Project are distributed graduation projects at the beginning of the school year by the scientific branches, according to the rates of students and a student graduating project to be completed and in the case of non-completion does not meet the terms of graduation. In addition, the distribution of students according to the plan prepared by the board of the department where possible to participate in the graduation project more than a student or one student for each project. The guidance to the Division of quality and performance of university and Heads of Branches in coordination with each other to select a pilot project through which participating seminars, conferences and official competitions guarantee

CRITERION 5. CURRICULUM

A. Program Curriculum

A.1. Table 5-1 Curriculum

Table 5-1 illustrates the normal course sequence in the program along with the average section enrollment (lecture, laboratory, recitation) in each course. Table 5-1 is attached at the end of this section (Criterion 5. Curriculum).

A.2. Relation with Program Educational Objectives

The linkage between the Program Educational Objectives (PEOs) and the Student Outcomes (SOs) is shown in Table 5-2. The achievement of the Student Outcomes (SOs) ensures that our graduates are well equipped to achieve the Program Educational Objectives in actual practice following graduation.

A.2.1 AEB Program Educational Objectives (PEOs):

The educational objectives of the undergraduate program in Aircraft Engineering are to produce graduates who (within a few years of graduation):

1. Successfully practice the aeronautics engineering disciplines;
2. Contribute to society and the profession;
3. Engage in life- long learning to advance professionally through continuing education and training;
4. Succeed in graduate studies in aeronautics engineering or a related field if pursued.

A.2.2 AEB Student Outcomes (SOs):

Students from the AEB program will attain (by the time of graduation):

a. an ability to apply knowledge of engineering, science, and mathematics (including multivariate calculus and differential equations);
b. an ability to design and conduct experiments, as well as to analyze and interpret data;
c. an ability to design systems, components, or processes to meet desired needs within realistic constraints;
d. an ability to function on multi-disciplinary teams;
e. an ability to identify, formulate, and solve energy and renewable energies engineering problems;
f. an understanding of professional and ethical responsibility;
g. an ability to communicate effectively in oral and written forms;
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
i. a recognition of the need for, and an ability to engage in life- long learning;
j. a knowledge of contemporary issues in energy and renewable energies engineering;
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

A.3. Relation with Student Outcomes

To assure that our graduates have achieved the Student Outcomes (SOs), the curriculum must contribute for achievement of each Student Outcome collectively. As all the Student Outcomes are addressed within the core curriculum, students of the Aircraft Engineering Program will be trained to achieve the Student Outcomes throughout the coursework. The ABET syllabi for the required courses describe a correlation of the course to the Student Outcomes as presented in Table 5-3.

A.3.1 Prerequisite Flow Chart

A flow chart showing the prerequisite structure of the AEB curriculum is attached after Table 5-1 at the end of this section (Criterion 5. Curriculum).

A.3.2 Major Components of the Program

The Aircraft Engineering program produces graduates who are prepared to enter the practice of aeronautics engineering. There are three major components of the program: (1) foundation in the mathematical and physical sciences, (2) engineering topics in mechanical with design applications, and (3) general education in the humanities and English course.

A.3.3 Mathematics and Physical Sciences

The engineering science fundamentals and engineering design skills are built upon the basic mathematics and physical sciences. The mathematics work begins with a three-course sequence (Math ME 123, ME 223) on differential and integral calculus. The two courses include topics in limits, derivatives, and the integrals of functions of one variable, work on partial derivatives and multiple integrals is presented. Vector analysis and three-dimensional analytical geometry is included in this course. Topics include solution of the first and second order linear differential equations with numerous applications. Laplace transforms, power series solutions, numerical methods and linear systems are included. With this foundation in mathematics, our students have necessary tools for applications in analysis and design. ME 323 Numerical analyses with particular applications in numerical differentiation and integration.

ME 138/ Properties of Material, the aims which can be achieved during teaching this course program are concept of materials science, classification of materials, atomic structure and the type of bonding forces, types of materials and their applications and the mechanical material properties.

It was noted that the number of hours for Math and Basic Science is only 16 hours and this is less than ABET requirement (32 hours). In next year (2018-2019), the number of hours will increase to from 16 to 32 hours, each credit hours for Math (I, II, III) and Properties of Material will increase from 4 to 8 hours.

A.4. Engineering Topics

The aim of the program is to graduate students capable to work as mechanical and aeronautical engineer in aeronautics field. The engineering topics are divided into three parts; preliminary general courses, mechanical courses, and final aeronautics courses.

Preliminary general courses:

1. ME145/ Workshop Training; Preparation of engineering cadres trained scientific and practical areas in the electricity, automobiles, machining (lathe, milling, drilling), forging, denting, filings, forging, welding, and casting.
2. Computer Programming, I Courses; ME122/ Computer Science (Visual BASIC programs), ME222/ Advanced Programming (C++) and (Microprocessors and MATLAB languages), ME429 /Advanced Computer Applications CAD and CAE.
3. ME238/ Manufacturing Processes, ME319/ Industrial Engineering, determine the most effective ways for an organization to use the basic factors of production.
4. ME134/, ME234/ Engineering and Machine Drawing is to teach students manual drafting and dimensioning of views, explains the principles of orthographic views, multi view projection and sectional view drawing.
5. ME448/ Project should be in the aeronautical engineering or designing fields.

Mechanical Courses,

1. ME137/, ME237/ Mechanics I, II this unit of study aims to provide theoretical knowledge and principles of statics and Dynamics.
2. ME342/ Theory of Machine, illustration and discussion the Main the application of theory of machine for the solution of equation(s) for velocity and acceleration, gear and gear train, belt, fly wheel and friction clutches that occur in most engineering of electromechanical field.
3. ME432/, ME4485/ Control Theory and vibration, illustration and discussion the principles of free & forced vibrations and definition, proceeding to the Student free & forced vibrations of single degree of freedom, illustration and discussion the Main Theoretical Principles of control systems and understanding of using different system Damping.
4. ME136/, ME236/ Thermodynamics I, II, Fundamental thermodynamic concepts including system, state, state postulate, equilibrium, process and cycle, Heat, work, 1st Law of Thermodynamics, Properties of a substance, Energy balances for idealized closed systems, Energy and mass balances for idealized control volumes, 2nd Law of Thermodynamics, Carnot cycles, thermal efficiencies, Entropy, isentropic processes, isentropic efficiencies, idealized power cycles (Otto, Diesel and Rankine).
5. ME 249/ Fluid Mechanics, it provides a working knowledge of Fluid Mechanics and Illustration and discussion the principles of Principle of fluid motional flow classification Bernoulli's equation as well as applications of Bernoulli's equation and anther subject in Fluid Mechanics.
6. ME345/ Heat Transfer; teach theoretical basics of the conduction, convection and radiation heat transfer Coincided with a laboratory experiment.
7. ME245/ Strength of materials, studying the stresses and strains of materials and its deflections.
8. ME388/ Gas Dynamics, studying the thermal analysis of the steam and gas

turbine plants.

9. ME454/ Machine Design II, Studying the advanced concepts of designing.
10. ME139/ Electrical Engineering, (illustration and discussion the fundamental f electric engineering and definition, proceeding to the student the DC Electrical Circuits, series, parallel, series-parallel and identify the equations voltages &current for circuits above).

Final Aeronautics Courses:

1. ME182/ Theory of Flight illustrate the fundamentals and basic principles of flight and flight theory.
2. ME384/ Aircraft Engines shows the types of engines and its principles of operation.
3. ME386/ Aerodynamics, studying the air distribution around multi-shapes and wings section, also the aerodynamic characteristics specifics.
4. ME387/ Aircraft Electricity and Instruments, studies the principles of aircrafts power systems, Giving Knowledge about its principles of operation and instrumentation.
5. ME481/ Aircraft Structures, study the structure types, loads, concentrates and design of aircraft body and frame.
6. ME432/ Automatic Aircraft Control (Autopilot), illustration and discussion the principles of aircraft controlling systems.
7. ME483/ Aircraft Engine and Jet Propulsion. shows the advanced application of engines and its principles of operation.
8. ME484/ Design of Aircraft shows the details steps of designing each part of the aircraft body and frame.
9. ME486/ Aircraft Stability study the theory of stability of flying body.
10. ME487/ Aircraft Systems and Maintenance, studying and illustrating the systems of aircrafts and the methods of maintenance for each one.

General Education

The third major area of the curriculum is the general education component. The University of Technology has a mandated General Education Requirements for all degrees. To satisfy the General Education Requirements the Aircraft Engineering Program set required courses in the general education component as follows:

EMEE 112/ English Language, this course will improve the ability of the students to understand, speak, read and write English as a second language with some technical texts. It is also intended to teach them, how to use technical English effectively as a language of instruction, Lab. Experiments and Exercises, examples, using Technical Terminologies as close as possible to the lectures they receive during their study.

ME111/ Human Rights & Democracy., Freedom and Democracy, the course covers the concept of human rights and development, definition, classes, properties, and the most important human rights conventions and declarations and international conventions on human rights, and human rights in religions and the role of non-governmental organizations in this field and other human rights issues. The substance of freedom and democracy include the concept of freedom and kinds, democracy and

the types and components, individual liberty and freedom forced to reconcile the sovereignty, freedom, democracy during the Greeks time, lobbyists, the most important theories on the nature of election, the rights of minorities in democratic governance and other topics that make the student familiar with the issues.

A.4. Major Design Experience

In the last year, students take Senior Capstone Design, which is the final major design course. In this course, students learn how to apply the basic engineering science and design principles to formulate a design problem, and then follow recommended process to complete the design project. Students are required to demonstrate their ability to use the knowledge of mechanical and aeronautical courses for the whole undergraduate curriculum. Some professional components if not taught in other courses, such as ethics, life- long learning to keep knowledge up to date, are covered in this course. For the capstone design experience. The students are typically in teams of three people. At the end of the year, all the design teams present their capstone design projects. All the AEB faculty members, representatives from industry and AEB Industrial Advisory Council members are invited at the presentation and they also serve as evaluators for the capstone design projects. The evaluation includes the project evaluation in three parts (overall technical content, presentation, and response to questions), assessment of the related Student Outcomes and comment.

A.5. Cooperative Education

The AEB Program have 4 weeks training in nearby industries during summer after third year. Their participants in the training will give them experience in real engineering work in industries. They also have meetings in final year with University Career Services.

A.6. Teaching Materials and Student Work Samples

For the required courses only, teaching materials (textbook, the regular course syllabus, course outlines, and list of assignments, etc.), and student work samples of all the assignments (homework, quizzes, exams, lab reports, and design projects, etc.) will be available for review at the time of visit.

B. Course Syllabi

The ABET course syllabi for all the required courses are contained in Appendix B, as listed in Table 5-4. Part 1 includes the courses taught by the AEB faculty, include a syllabus for each course used to satisfy the mathematics, science, and discipline-specific requirements required by Criterion 5 or any applicable program criteria

Table 5.1 Department of Machines and Equipment Engineering / Aircraft Engineering Branch

No.	First year stage Subjects	Studying Hours			Units	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]
		Theoretical	Experimental	Tutorial		
ME/ 111	Human Rights & Democracy	1	-	1	2	R
ME/ 122	Programming I	1	1	-	3	R
ME/ 123	Mathematics I	2	-	1	4	R
ME/ 134	Eng. Drawing & Descriptive Geometry	1	3	-	5	There is one hr. for Drawing by computer
ME/ 145	Workshops	-	6	-	-	R
ME/ 136	Thermodynamics I	2	1	1	5	R
ME/ 137	Mechanics I	2	1	1	5	R
ME/ 138	Properties of Material	2	-	-	4	R
ME/ 139	Electrical Engineering	2	1	-	5	R
Sum.		**13**	**13**	**4**	**33**	
Total Subjects =9		**Total Hours = 30**			**Total Units = 33**	

No.	Second year stage Subjects	Studying Hours			Units	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]
		Theoretical	Experimental	Tutorial		
ME/ 281	Theory of Flight	2	-	-	4	R
ME/ 222	Programming II	1	1	-	3	R
ME/ 223	Mathematics II	2	-	1	4	R
ME/ 234	Mechanical Drawing	1	2	-	4	There is one hr. for Drawing by computer
ME/ 245	Strength of Materials	3	1	-	7	R
ME/ 236	Thermodynamics II	2	1	1	5	R
ME/ 237	Mechanics II	2	-	1	4	R
ME/ 238	Manufacturing Processes	2	3	-	5	R
ME/ 249	Fluid Mechanics I	2	1	1	5	R
Sum.		**17**	**9**	**4**	**41**	
Total Subjects= 9		**Total Hours = 30**			**Total Units = 41**	

No.	Third year stage Subjects	Studying Hours			Units	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]
		Theoretical	Experimental	Tutorial		
ME/ 321	**Engineering and Numerical Analysis**	2	1	-	5	R
ME/ 342	**Theory of Machines**	2	1	1	5	R
ME/ 343	**Mechanical Engineering Design I**	2	1	1	5	R
ME/ 348	**Aircraft Engines**	2	1	1	5	R
ME/ 345	**Heat Transfer**	2	1	1	5	R
ME/ 386	**Aerodynamics**	2	1	1	5	R
ME/ 387	**Aircraft Electricity and Instruments**	2	-	-	4	R
ME/ 388	**Gas Dynamics**	1	1	1	3	R
ME/ 319	**Industrial Engineering**	2	-	-	4	R
Sum.		**17**	**7**	**6**	**41**	
Total Subjects= 9		**Total Hours = 30**			**Total Units = 41**	

No.	Fourth year stage Subjects	Studying Hours			Units	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]
		Theoretical	Experimental	Tutorial		
ME/ 481	**Aircraft Structures**	2	-	1	4	R
ME/ 432	**Automatic control**	2	1	-	5	R
ME/ 483	**Aircraft Propulsion Systems Technology and Design**	2	1	1	5	R
ME/ 484	**Designs of Aircraft**	3	-	1	6	R
ME/ 485	**Aircraft Vibration**	2	1	1	5	R
ME/ 486	**Aircraft Stability and control**	2	1	-	5	R
ME/ 487	**Aircraft Systems and Maintenance**	2	1	1	5	R
ME/ 448	**Project**	1	2	-	4	R
ME/ 429	**Computer Added Engineering**	1	1	-	3	R
Sum.		17	8	5	42	
Total Subjects= 9		**Total Hours = 30**			**Total Units= 42**	

Table 5.2 Curriculum

Mechanical Engineering Department / Aircraft Engineering Branch

Course (Department, Number, Title) List all courses in the program by term starting with first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]	*Curricular Area (Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Average Section Enrollment for the Last Two Terms the Course was Offered[1]
		Math & Basic Sciences	Discipline Specific Topics	General Education	Other		
Human Rights & Democracy	**R**	**-**	**-**	**2**		2014-2016	100
Programming I	**R**	**2**	-	-		2014-2016	100
Mathematics I	**R**	**3**	-	-		2014-2016	100
Engineering Drawing &Descriptive Engineering	**R**	-	-	**4**		2014-2016	100
Workshops	**R**	**6**	-	-		2014-2016	100
Thermodynamics I	**R**	**-**	**4**	-		2014-2016	100
Mechanics I	**R**	**4**	-	-		2014-2016	100
Properties of Material	**R**	**2**	-	-		2014-2016	100
Electrical Engineering	**R**	**3**	-	-		2014-2016	100
First Year							
Theory of Flight	**R**	**-**	2	-		2014-2016	100
Programming II	**R**	**2**	-	-		2014-2016	100
Mathematics II	**R**	**3**	-	-		2014-2016	100
Mechanical Drawing	**R**	-	**3**	-		2014-2016	100
Strength of Materials	**R**	-	**3**	-		2014-2016	100
Thermodynamics II	**R**	**-**	**4**	-		2014-2016	100
Mechanics II	**R**	**-**	**3**	-		2014-2016	100
Manufacturing Processes	**R**	**-**	**4**	-		2014-2016	100
Fluid Mechanics I	**R**	**-**	**4**	-		2014-2016	100

Second Year							
Engineering and Numerical Analysis	**R**	**3**	-	-		2014-2016	100
Theory of Machines	**R**	-	**4**	-		2014-2016	100
Mechanical Engineering Design I	**R**	-	**4**	-		2014-2016	100
Heat Transfer	**R**	-	**4**	-		2014-2016	100
Aircraft Engines	**R**	-	4	-		2014-2016	100
Aerodynamics	**R**	-	4	-		2014-2016	100
Aircraft Electricity and Instruments	**R**	-	2	-		2014-2016	100
Industrial Engineering	**R**	-	**2**	-		2014-2016	100
Gas Dynamics	**R**	-	3	-		2014-2016	100
Third Year							
Aircraft Structures	**R**	-	3	-		2014-2016	100
Automatic control	**R**	-	3	-		2014-2016	100
Aircraft Propulsion Systems Tech. and Design	**R**	-	4	-		2014-2016	100
Designs of Aircraft	**R**	-	4	-		2014-2016	100
Aircraft Vibration	**R**	-	**4**	-		2014-2016	100
Aircraft Stability and control	**R**	-	3	-		2014-2016	100
Aircraft Systems and Maintenance	**R**	-	**4**	-		2014-2016	100
Project	**R**	-	3	-		2014-2016	100
Computer Aided Engineering	**R**	-	2	-		2014-2016	100
Fourth Year							
Add rows as needed to show all courses in the curriculum.							
OVERALL TOTAL CREDIT HOURS FOR THE DEGREE		***118 hours per a week***				***About 3570 hours for B.Sc.***	
PERCENT OF TOTAL		*23.7%*	*71.3%*	*5%*	*0%*		

1. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.

Table 5.3 Lessons weekly program table for Mechanical Engineering / Aircraft Branch, of the academic year 2017-2018

Weekly Lectures Table		Class Level			
Day	**Time**	**1st Class**	**2nd Class**	**3rd Class**	**4th Class**
Sunday	8:30 - 9:30	Workshop	Mechanical Drawing	Mechanical Engineering Design I	Designs of Aircraft
	9:30 - 10:30				
	10:30 - 11:30		CAD Lab. II Programing Lab. II	Engineering and Numerical Analysis	Aircraft Propulsion Systems Technology and Design
	11:30 - 12:30				
	12:30 - 1:30		Flight Theory	Aircraft Electricity and Instruments	Designs of Aircraft
	1:30 - 2:30				
Monday	8:30 - 9:30	Laboratory	Workshop	Gas Dynamics	Lab. II
	9:30 - 10:30				
	10:30 - 11:30	CAD Lab. Programing Lab.	Thermodynamic II		Aircraft Propulsion Systems Technology and Design
	11:30 - 12:30			Theory of Machines	
	12:30 - 1:30	Material Properties			Aircraft Vibration
	1:30 - 2:30		-		
Tuesday	8:30 - 9:30	Thermodynamic I	Laboratory	Heat Transfer	Computer Added Engineering
	9:30 - 10:30				
	10:30 - 11:30		Fluids I		Designs of Aircraft
	11:30 - 12:30	Mechanic		Aerodynamics	
	12:30 - 1:30		Strength of Materials		
	1:30 - 2:30		Programming II		
Wednesday	8:30 - 9:30	Mathematics I	Mathematics II	Mechanical Engineering Design	Automatic control
	9:30 - 10:30				
	10:30 - 11:30			Aircraft Engines	Project
	11:30 - 12:30	Electricity	Mechanics II		
	12:30 - 1:30				Lab. I
	1:30 - 2:30	-			
Thursday	8:30 - 9:30	Engineering Drawing	Manufacturing Processing	Lab. II	Automatic control
	9:30 - 10:30				
	10:30 - 11:30		Strength of Materials	Lab. I	
	11:30 - 12:30	Programing			Aircraft Stability and control
	12:30 - 1:30	Human Rights	Fluids I	Industrial Engineering	
	1:30 - 2:30	-	-		

Table 5.4 Material correlation in the description of courses curriculum

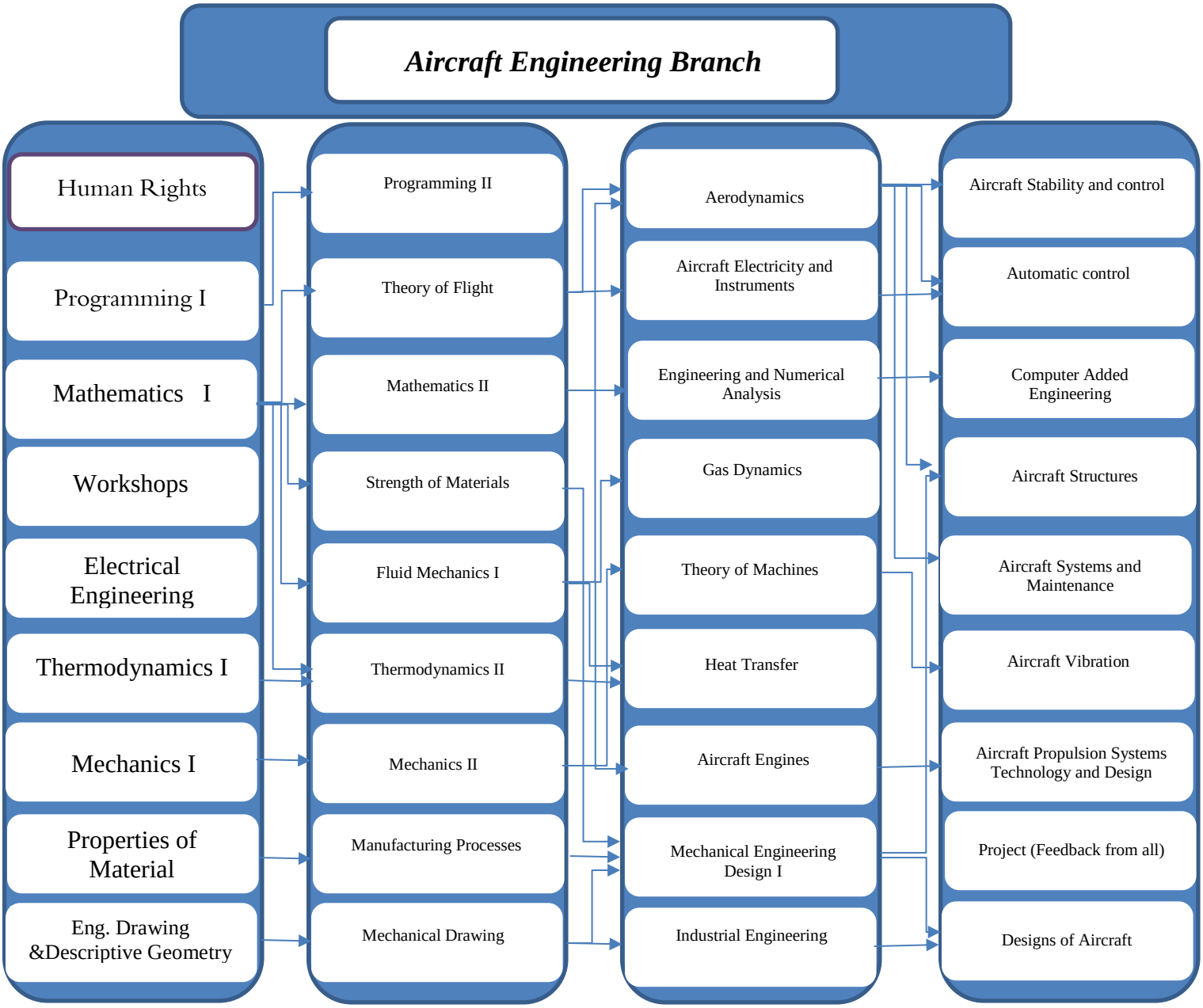


Table 5.5 Program Curriculum Overview and Relationship of Courses in the Curriculum to the PEO for ME Program

Categories	Subject	Code	Crds	Total	PEO1	PEO2	PEO3
Mathematics	Mathematics I	ME123	3	6	×	×	×
	Mathematics II	ME223	3		×	×	×
Science & Engineering	Eng. Drawing & Descriptive Eng.	ME134	4	23			
	Workshops	ME145	6		×	×	×
	Mechanics I	ME137	4		×	×	
	Properties of Material	ME138	2		×	×	
	Engineering & Numerical Analysis	ME321	3		×	×	
	Mechanics II	ME237	2		×	×	
	Aircraft Electricity and Instruments	ME387	4		×	×	
Engineering	Thermodynamics I	ME136	4	69	×	×	
	Aircraft Systems and Maintenance	ME487	5		×	×	
	Mechanical Drawing	ME234	3		×	×	
	Strength of Materials	ME245	3		×	×	
	Thermodynamics II	ME236	4		×	×	
	Theory of Flight	ME281	2		×	×	
	Manufacturing Processes	ME238	3		×	×	
	Fluid Mechanics I	ME249	4		×	×	
	Theory of Machines	ME342	4		×	×	
	Machine Design II	ME354	4		×	×	×
	Heat Transfer	ME345	4		×	×	
	Aircraft Vibration	ME485	4		×	×	
	Industrial Engineering	ME319	2		×	×	
	Aircraft Engines	ME384	5		×	×	
	Aerodynamics	ME386	5		×	×	
	Gas Dynamics	ME388	4		×	×	
	Automatic Control	ME432	3		×	×	
	Aircraft Structures	ME481	6		×	×	
	Designs of Aircraft	ME484	6		×	×	×
	Aircraft Stability and control	ME486	5		×	×	

Computer hardware & Software	Programming I	ME122	2	4	×	×	
	Programming II	ME222	2		×	×	
	Computer Aided Eng. CAE	ME429	4	8	×	×	×
Electrical Engineering	Electrical Engineering	ME139	3	3	×	×	
Project		ME448	2	2	×	×	×
General education (Humanities)	Human Rights & Democracy	ME111	2	2	×		
Total			119				

Bachelor Requirements of Science in Mechanical Engineering

Disciplines Classified in the curriculum department of the educational program by categories (topics) of the following:

(1) Pure Sciences.
(2) Humanities.
(3) Basic Engineering Sciences.
(4) Specialized Engineering Sciences.

Topics and vocabulary of the educational program curriculum in equipment and machines engineering department aimed at enabling students to develop knowledge and skills through:

- Describing and finding solutions to the problems of engineering through application of basic mathematical and scientific concepts.
- Developing initial efficiency in mechanical engineering disciplines.
- Developing the ability to conduct experiments, critical analysis and interpretation of data.
- Implementing integrated mechanical engineering designs of systems, components and processes or through practical experiences.
- Identifying, formulating and solving mechanical engineering problems by using modern engineering tools, techniques, and skills.
- Cooperating in practical experiments and graduation projects.
- Developing the skills of written and oral communication through project proposals.
- Getting an estimate for some of the ethical problems that arise from the exercising work.

The Appendix (4-6) shows the course description of mechanical engineering program.

The following is a summary of the credit hours for the educational program and the distribution of the curriculum topics (Table 5.6) and (Figure 5.1).

Table (5.6) Summary of hours and topics of curricula and their proportions of the total number of hours

Four years	Full academic year		
The number of hours	The branch		
119	Aircraft Engineering		
Curriculum			
Type	Hours N.	percentage	Branch
Basic Science	17	%14.3	Aircraft Eng.
Humanities	4	%3.36	Aircraft Eng.
Basic Engineering Sciences	37	%31	Aircraft Eng.
Specialized Engineering Sciences	61	%51.3	Aircraft Eng.

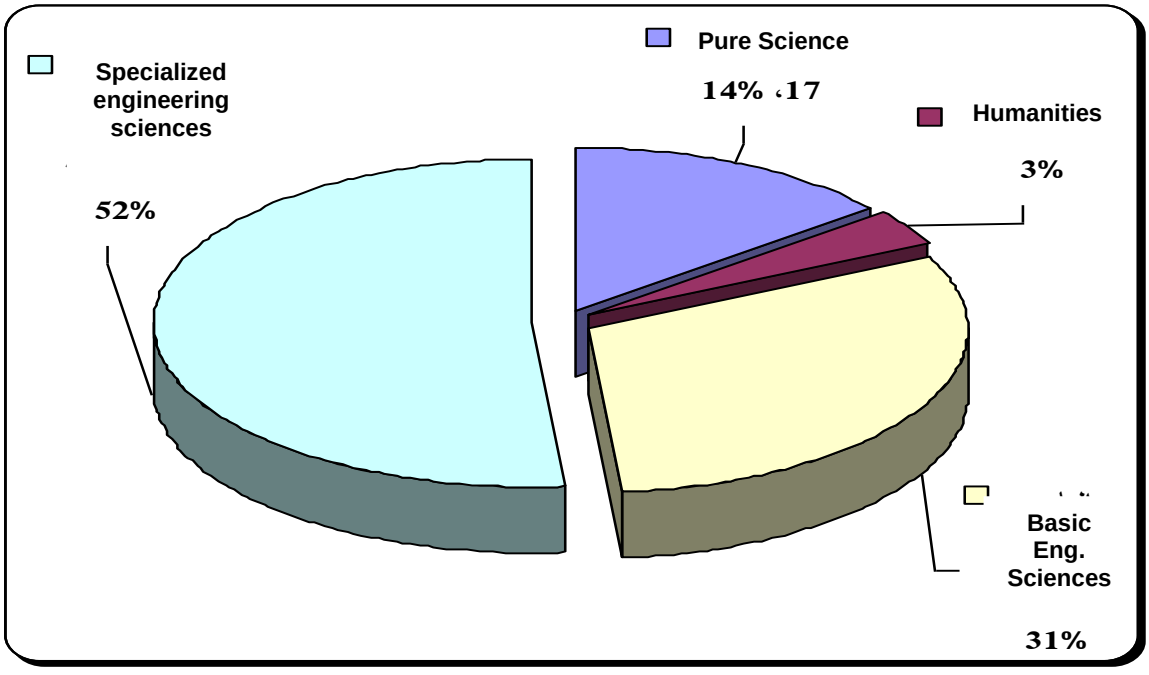


Figure 5.1 detailed distribution of the total topics of mechanic's branch curriculum.

Summer Training

The requirements for obtaining a bachelor's degree in mechanical engineering is that the students should complete sixty days of the summer training in the common sector or the public sector and this training is a mandatory element of the graduation requirements and be under the supervision of the summer training commission in the departments, (Appendix 4-8 mechanism of the Commission Summer Training action).

Graduation Project

One of the graduation requirements is that the student should achieve the last stage for graduation project (IV). These graduation projects are being distributed at the beginning of the school year by the disciplines according to the rates of students. The graduation project should be completed by student and in case of non- completion he will not meet graduation requirements. Students are being distributed according to the plan prepared by the department where it is possible for a student and more to take part in the graduation project. The Division of Quality Assurance and university performance and Heads of Branches have been directed to coordinate with each other to choose a leading project through which they can participate in seminars, conferences and official competitions.

Supplement (4-7 mechanism of the projects Commission action).

The Accordance of the Curriculum with the Objectives of Educational Program.

The faculty members have a kind of authorities to identify, revise, implement and achieve the objectives of the educational programs. For the purpose of evaluating the curriculum, the input and output should be known from students, graduates and employers to feed their opinions to the department for the purpose of auditing and continuous assessment of the subjects of this program, as well as identifying goals and revising the educational programs to ensure the results of the students.

Therefore, the above-mentioned process ensures alignment of the curriculum with the objectives of the program as shown in the various tables. Department of equipment and machines engineering and through meetings of department Council and the Public authority, created topics are discussed on various topics and exchanged ideas to find ways that lead to an effective and efficient educational program of mechanical engineering.

CRITERION 6. FACULTY

A. *Faculty Qualifications*

Aircraft engineering branch gives priority in the appointment of faculty members of the holders of a doctorate degree from a prestigious international university. The number of faculty members has changed over the past ten years (depending on the circumstances of the country). The load distribution of teaching and according to scientific rank of faculty members and are as follows: 6 credit hours' maximum for a professor.8 credit hours max Assistant Professor.10 credit hours' maximum for the teacher, and 12 credit hours' maximum assistant teacher. Any additional overhead for each faculty member financially offset.

Table (6.1) Shows the percentage of faculty members and their qualifications for the total number of students *Work In lieu of Courses*

Faculty Member						Total	Gender
certification		Scientific title					
Master	Doctoral	Professor	Assistant Prof	Lecturer	Assistant lecturer		
12	10	0	5	7	7	19	Mail/ 18
8.8%	7.3%	0.0 %	3.9%	6.48%	5.6%	16.82%	Female/ 1
Relative to 100students of (2017-2018)							

B. *Faculty Workload*

The complete members of the Aircraft Eng. Stuff are as illustrated as below in Table (6.2)

Table (6.2), Faculty Workload Summary and describe this information in terms of workload expectations or requirements.

No.	Title	Name	Specialty	Work load	Theory	Practical	Project	above a work load
1	Asst. Prof. Dr.	Abdul Satar Jwad Mohammed	Power	2	12	2	4	16
2	Asst. Prof. Dr.	Nabil Noor Swadi	Applied	6	12	4	4	18
3	Asst. Prof. Dr.	Abd Alkarem Abass Khdher	Power	6	16	2	4	16
4	Asst. Prof. Dr.	Hossain Whaeeb Mashi	Power	6	10	2	4	10
5	Asst. Prof. Dr.	Hossain Mohammed Hossain	Applied	10	8	2	4	4
6	Lecturer Dr.	Ahmed Adnan Abdul Jabbar	Applied	6	8	4	4	10
7	Lecturer Dr.	Nibras M. Mahdi	Power	10	10	2	4	6
8	Lecturer Dr.	Akeel Ali Wanas	Applied	10	6	4	4	4
9	Lecturer Dr.	Ali Yaser Hassan	Applied	8	8	6	2	8
10	Lecturer Dr.	Sadoon Kadhom Aeed	Power	8	6	4	2	4

11	Lecturer	Ali Abdul Mehdi Humadi	**Applied**	**10**	**8**	**4**	**4**	**6**
12	Lecturer	Abdul Jabaar Gweer Shamik	**Power**	**10**	**6**	**6**	**4**	**6**
13	Asst. Lecturer	Falih Hasan Abed Abdulaa	**Power**	**12**	**8**	**4**	**4**	**4**
14	Asst. Lecturer	Humam Mohamed Salih	**Applied**	**12**	**6**	**6**	**4**	**4**
15	Asst. Lecturer	Ahmed Sadeq Yousif	**Power**	**12**	**8**	**6**	**2**	**4**
16	Asst. Lecturer	Ali Jabbar Dawood	**Applied**	**12**	**6**	**6**	**2**	**2**
17	Asst. Lecturer	Laith Ayad Salman	**Applied**	**12**	**-**	**-**	**-**	**-**
18	Asst. Lecturer	Humam Kareem Jalghaf	**Power**	**12**	**8**	**6**	**2**	**4**
19	Asst. Lecturer	Noora Saleh Ekab	**Power**	**12**	**6**	**6**	**2**	**2**
20								
21								
22								

C. Faculty Size

The size of the Aircraft Eng. Branch faculty is 19 instructors as can be illustrated in Table (6.3) below.

Table (6.3) Number of faculty members of the branch of the aircraft and their percentage according to the total number of aircraft engineering branch students for the graduation academic year (2017-2018)

Total	**Aircraft Eng. Members Staff**						
	Scientific Title				**Degree**		
	Asst. Lecturer	**Lecturer**	**Asst. Prof.**	**Prof.**	**PhD**	**MSc**	
19	**7**	**7**	**5**	**0**	**10**	**9**	
%19.2	**%7**	**%8.7**	**4.5%**	**%0.0**	**%12.5**	**%10.5**	**Branch Student Percentage to Staff 2017-2018**

D. Professional Development

In faculty vitae

E. Authority and Responsibility of Faculty

Assigned to the department head assistants and heads of branches by the President of the University on the recommendation of the department head. In addition, continue

their work for four consecutive years, it can be extended at the end of his or instruct another member of the faculty members to take his place. Associate Administrator of the head of the department assigned to the members and the coordinators of the various departments and committees, as well as distribute administrative tasks. Scientific Associate Head of Department manages and coordinates all of the terms of scientific committees and management of scientific plan and curriculum for the department. Head of Department chairs the meetings of the board of the department (which consists of Cooperators administrative, scientific and heads of branches and representative of the teachers' union) represents a section in the meetings of the Council of the University of Technology, The Chief of Section exercise scientific, administrative and financial authorities.

The responsibility of teaching full-time faculty members and university service by law and includes teaching and research, institutional services and commissions and professional services community. Furthermore, the possibility of initiating a faculty member in the modernization of the curriculum under the supervision of the Scientific Committee and put it through the section meetings in the General Assembly. And it is offered the proposal to amend the curriculum to the Scientific Committee of the university in the University of Technology to get the final approval.

Instructions for the job description of faculty members

Article 1

A faculty member at University of Technology teaches, performs academic research, provides educational guidance and academic supervision to the students of undergraduate and postgraduate students, provides experience, and participates in academic and other committees.

Article 2

Faculty members dedicate their time to teach at the university. The college council may approve an exception for a faculty member from full-time commitment for reasons that the council finds convincing.

Article 3

I. The faculty member shall work a minimum of (35) thirty-five hours per week.
II. The faculty member shall conduct academic research in accordance to an annual academic plan suggested by the academic department, recommended by the college council, and authorized by the university council, provided that the member shall complete at least one study per year.
III. Hours spent in providing academic supervision and educational guidance by faculty members tasked to do so are considered lectures at the rate of one hour per group but shall not exceed (4) four hours per week.
IV. The faculty member shall participate in:
    a. University activities (cultural fairs, University Day, college exhibitions, graduation ceremonies, and student events, as well as other academic, social, and educational events upon request.
    b. Writing, translation, and publishing.
    c. Membership in permanent councils and committees inside and outside the

university. One additional hour shall be noted for membership in a permanent council.

d. Intellectual, educational, and academic development of the academic departments by submitting studies, research, reports, plans, educational syllabi, etc.
e. Conducting tests and monitoring their conduct.
f. Seminars, conferences, and classes in Iraq and abroad.
g. Continuing education courses held at the university and elsewhere.
h. Working at the University's specialized advisory centers, offices, and clinics.

V. The department head shall determine the number of hours needed to accomplish the tasks provided in item IV of this article, which are among the duties of the faculty member, provided that such hours shall not be counted against his quota or articles except for the provisions of item III and paragraphs (c) and (e) of item IV of this article.

Article 4

I. The faculty member's weekly quota shall be as follows:
   a. Professor: (4) eight teaching hours.
   b. Adjunct: (8) ten teaching hours.
   c. Lecturer: (12) twelve teaching hours.
II. The quota may be reduced by no more than two thirds of the quota for those employed at the university's research centers.
III. The number of the faculty member's classroom and practical teaching hours shall be at a rate of hours per week as authorized for the academic rank.
IV. The quota for the faculty member shall be limited to classroom and practical teaching hours, supervision of undergraduate and postgraduate projects, academic supervision, and educational guidance.
V. Two hours shall be reduced from the quota of faculty members whose are fifty years old or older.
VI. The quota for the faculty member during university vacations and the summer quarter shall be zero.

Article 5

Classroom and practical teaching hours for a full-time university faculty member shall be calculated according to the following:

I. The upper limit for theoretical subjects in a single quarter is (3) three subjects in his or her specialty, which may be increased by one subject only in cases of absolute necessity as determined by the college council and subject to the approval of the president of the university.
II. Each hour of practical, applied, or field teaching, training, or discussion shall be calculated as one hour.
III. Supervision of each graduation research project at the undergraduate level shall be calculated as two hours per week, provided that the number of projects supervised is no more than (4) four.

IV. Supervision of each postgraduate student's dissertation shall be calculated as follows:
   a. (3) Three preliminary theoretical hours in the first week for a high diploma.
   b. (4) Four preliminary theoretical hours in the first week for a master's degree.
   c. (6) Six preliminary theoretical hours in the first week for a doctorate.

V. In cases of joint supervision, supervision hours and bonuses are accounted in full for each of the supervisors.

VI. Each hour of teaching at the postgraduate level shall be accounted as the equivalent of two theoretical hours at the undergraduate level for the purposes of compensation for extra lectures.

VII. A faculty member may exclusively teach or supervise postgraduate dissertations, or combine the two, when necessary, with the approval of the college council.

Article 6

I. The number of doctoral theses simultaneously supervised by a faculty member shall not be more than (3) three.

II. The number of magisterial dissertations simultaneously supervised by a faculty member shall not be more than (3) three. However, in cases of absolute necessity, subject to the recommendation of the competent department and the approval of the college council, the number may be increased to no more than (6) six dissertations.

III. Joint supervision of dissertations is possible in cases specified by the department council and authorized by the college council. In such cases, compensation shall be as specified in item V of article 5 of these instructions.

IV. The number of professional higher diplomas supervised by the faculty member shall not be more than (4) four, which may be increased to no more than (6) six in cases of absolute necessity by a decision from the college council.

V. No more than nine dissertations may be supervised individually or jointly.

VI. If a faculty member has supervisory duties of one type (doctoral, magisterial, or higher diploma), supervision shall be as follows:
   a. (5) Five doctoral dissertations
   b. (7) Seven magisterial dissertations
   c. (9) Nine higher diploma dissertations

Article 7

I. The president of the university, as required for the general good, may task a member of the faculty with duties related to the overall academic, educational, and administrative activities. In such a case, the faculty member be entitled to additional hours of no more than (6) six hours per week.

II. The college council may allocate no more than (4) four additional hours per week to the faculty member if the faculty member is tasked with duties related to the development of the educational or administrative process, provided that this takes place at the start of each educational year or quarter.

Article 8

The weekly quota is:

I. Dean: Zero
II. Assistant Dean: (4) four hours.
III. Department head: (4) four hours.

Article 9

I. The quota of the department coordinator is reduced by (4) four hours per week.
II. The college council may reduce the quota of the person tasked to be the postgraduate coordinator by no more than (4) four hours per week.

Article 10

I. A part-time faculty member who is a physician, dentist, or pharmacist who is employed at the university hospital shall teach the same number of hours as a full-time member of the university service of equal academic rank.
II. A part-time faculty member shall work no fewer than (30) thirty hours distributed as required by the college. Any additional hours shall be treated as overtime pursuant to the effective instructions on lecture pay.
III. Priority shall be given to full-time faculty members when forming branch councils and the Saddam Medical College Council.
IV. Part-time faculty members may practice their professions outside of official working hours.
V. Priority shall be given to full-time faculty members in academic courses and dispatches.

Article 11

A part-time faculty member shall teach the same quota for his or her academic rank as a fill-time member, provided that his or her weekly hours are no more than (29) twenty-nine hours.

Article 12

The Chancellor of the university may dedicate faculty members to work at the university administration, academic research centers, and academic authorities and centers.

Table 6-1. Faculty Qualifications

Mechanical Engineering

Faculty Name	Highest Degree Earned-Field and Year	Rank [1]	Type of Academic Appointment[2] T, TT, NTT	FT or PT[3]	Years of Experience			Professional Registration/ Certification	Level of Activity[4] H, M, or L		
					Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Abdul Satar J. Mohammed	**Ph.D.**	**AST**	**TT**	**FT**	**38**	**30**	**13**		**H**	**H**	**H**
Nabil Noor Swadi	**Ph.D.**	**AST**	**TT**	**FT**	**35**	**22**	**13**		**H**	**H**	**H**
Abd Alkarem Abass Khdher	**Ph.D.**	**AST**	**TT**	**FT**	**32**	**20**	**20**		**H**	**H**	**H**
Hossain Wahaeb Mashi	**Ph.D.**	**AST**	**TT**	**FT**	**35**	**25**	**15**		**H**	**M**	**H**
Hossain Mohammed Hossain	**Ph.D.**	**AST**	**TT**	**FT**	**15**	**13**	**13**		**H**	**H**	**H**
Nibras M. Mahdi	**Ph.D.**	**I**	**TT**	**FT**	**15**	**14**	**14**		**H**	**H**	**H**
Sadoon Kadhim Ayed	**Ph.D.**	**I**	**T**	**FT**	**15**	**13**	**13**		**M**	**M**	**M**
Ahmed Adnan Abdul Jabbar	**Ph.D.**	**I**	**T**	**FT**	**24**	**14**	**13**		**H**	**H**	**H**
Ali Yaser Hassan	**Ph.D.**	**I**	**T**	**FT**	**15**	**14**	**14**		**H**	**H**	**H**
Akeel Ali Wanas	**Ph.D.**	**I**	**T**	**FT**	**13**	**10**	**13**		**H**	**H**	**H**
Ali Abdul Mehdi Humadi	**MSc.**	**I**	**T**	**FT**	**36**	**30**	**13**		**H**	**H**	**H**

Abdul Jabaar Gweer Shamik	**MSc.**	**I**	**TT**	**FT**	**36**	**10**	**10**		**H**	**H**	**H**
Humam Mohamed Salih	**MSc.**	**I**	**T**	**FT**	**34**	**10**	**10**		**H**	**H**	**H**
Humam Kareem Jalghaf	**MSc.**	**A**	**T**	**FT**	**20**	**3**	**13**		**H**	**H**	**H**
Falih Hasan Abed Abdulaa	**MSc.**	**A**	**T**	**FT**	**29**	**10**	**10**		**M**	**M**	**M**
Ahmed Sadeq Yousif	**MSc.**	**A**	**T**	**FT**	**32**	**10**	**10**		**H**	**H**	**H**
Ali Jabbar Dawood	**MSc.**	**A**	**TT**	**FT**	**34**	**10**	**10**		**H**	**H**	**H**
Laith Ayad Salman	**MSc.**	**A**	**T**	**PT**	**10**	**4**	**10**		**H**	**H**	**H**
Noora Saleh Ekab	**MSc.**	**A**	**T**	**FT**	**30**	**20**	**20**		**M**	**M**	**M**

Instructions:

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other
2. Code: TT = Tenure Track T = Tenured NTT = Non-Tenure Track
3. At the institution
4. The level of activity, high, medium or low, should reflect an average over the year prior to the visit plus the two previous years.

Table 6-2. Faculty Workload Summary

Faculty Member (name)	PT or FT[1]	Classes Taught (Course No./Credit Hrs.) Term and Year[2]	Program Activity Distribution[3]			% of Time Devoted to the Program[5]
			Teaching	Research or Scholarship	Other[4]	
Abdul Satar Jwad Mohammed	FT	ME483, ME384	65%	25%	10%	100%
Nabil Noor Swadi	FT	ME342	60%	30%	10%	100%
Abd Alkarem Abass Khdher	FT	ME484, ME388	80%	5%	15%	100%
Hossain Waheb Mashi	FT	ME136, ME236	80%	15%	5%	100%
Hossain Mohammed Hossain	FT	ME432	80%	5%	15%	100%
Nibras M. Mahdi	FT	ME386	75%	5%	20%	100%
Ahmed Adnan Abdul Jabbar	FT	ME487	80%	15%	5%	100%
Akeel Ali Wanas	FT	ME486	60%	25%	15%	100%
Ali Abdul Mehdi Humadi	FT	ME234	80%	10%	10%	100%
Abdul Jabaar Gweer Shamik	FT	ME134	80%	10%	10%	100%
Ali Jabbar Dawood	FT	ME122	75%	10%	15%	100%
Ali Yaser Hassan	FT	ME222	25%	75%	-	100%
Falih Hasan Abed Abdulaa	FT	ME234	80%	10%	10%	100%
Humam Mohamed Salih	FT	ME387	80%	10%	10%	100%
Ahmed Sadeq Yousif	PT	ME429	80%	10%	10%	100%

Sadoon Kadhim Ayed	**FT**	**-**	**-**	**100%**	**-**	**100%**
Laith Ayad Salman	**PT**	**-**	**-**	**100%**	**-**	**100%**
Humam Kareem Jalghaf	**FT**	**ME429**	**80%**	**10%**	**10%**	**100%**
Noora Saleh Ekab	**FT**	**ME123**	**75%**	**5%**	**20%**	**100%**

1. FT = Full Time Faculty or PT = Part Time Faculty, at the institution
2. For the academic year for which the Self-Study Report is being prepared.
3. Program activity distribution should be in percent of effort in the program and should total 100%.
4. Indicate sabbatical leave, etc., under "Other."
5. Out of the total time employed at the institution.

CRITERION 7. FACILITIES (Offices, Classrooms and Laboratories)

7.1 Buildings, Laboratories and Educational Facilities

7.1.1 Buildings

Department of equipment and machines engineering has two buildings because it is one of the largest engineering departments at the University of Technology and they are:

• Building (M) (Main): It is the headquarter of the main department, which is still under rehabilitation.

• Building (B) (Branch): It is attached to the department building which now has become the headquarter of the main department.

Each building contains three floors and a basement that includes the faculty offices, classroom, laboratories and the headquarters of the committees, units and branches receptions civil defense officers and stores, while the offices of the heads of branches, a library of Graduate Studies, the Internet unit and free books store and ateliers are being distributed on two buildings except the presidency of the department located in the main building. Each branch of the four ones of engineering specialties contained in the engineering department includes coordinators, secretarial and some of faculty members

The department gives more attention to services facilities through maintenance unit that follows up all the department belongings including the elevator which contains a reserve battery if the power goes out suddenly , and there are reception and civil defense officers in every building who take responsibility to monitor the building and protect it day and night , as well as there is ongoing perpetuating for health facilities located symmetrically in the building floors(right and left) , as well as providing first aid and essential medicines in the pharmacy in all headquarters of the committees , units, divisions , branches and senior leadership.

The department provides stationery with its supplies and cleaning materials for all laboratories, ateliers and headquarters. There are also a sports arena with an area of 1000 m^2, and a (50) m^2 hall for various activities.

Supplement (7-1) illustrates some of the department pictures and its laboratories and academic halls.

Supplement (7-2) shows contents of the building's floors M and B

Supplement (7-3) shows the geographical location of University of Technological and department according to GPS data.

And in brief description, we will look to:

• faculty offices.

• classrooms.

• laboratories.

• Library.

Faculty Offices

Faculty offices are located in two buildings (M and B) and each room occupied by teaching one teacher and in some cases (2-3) teachers, so the office spaces are ranging between (20-10) m^2, Supplement (7-2), and these rooms are well furnished carpeted, air-conditioned and equipped with Internet service. In addition to the fact

that all teaching staff are provided with a laptop computer and currently more than one teacher is being integrated in a room and quite more than before because of current stability in the attached building until completing the restoration of the main headquarter (A).

Notes:

• Rooms containing 5 faculty offices are allocated for individual with part-time leave (PhD students).

• Room No.115 are for the presidency of the aircraft branch and 114 for its secretary, 217 for the presidency of the mechanic's branch, 216 for its Secretary .303 for the administrative assistant, 302 for its Secretary ,304 for Scientific assistant 305 for its Secretary, 309 for the Administrative Divisions.

to be (75) for the current year after qualifying the third floor of the building (A).

Classrooms

Classrooms are divided into two buildings M and B, including large and small ones, which all have (146) (WIGHT BOARD) and (4) (SMART BOARDS): There are two types of these smart boards:

• E-beam board with a contact pen.

• Key-tab board; this kind of blackboards is very sensitive that should not be writing on or strep. It has a sensor pen biasing charger.

It should be noted that all classrooms are air-conditioned, including the Hall of Graduate Studies and the halls of conferences and seminars, and the latter two also contain integrated and different display devices and their accessories and laptop computer equipped with Internet service.

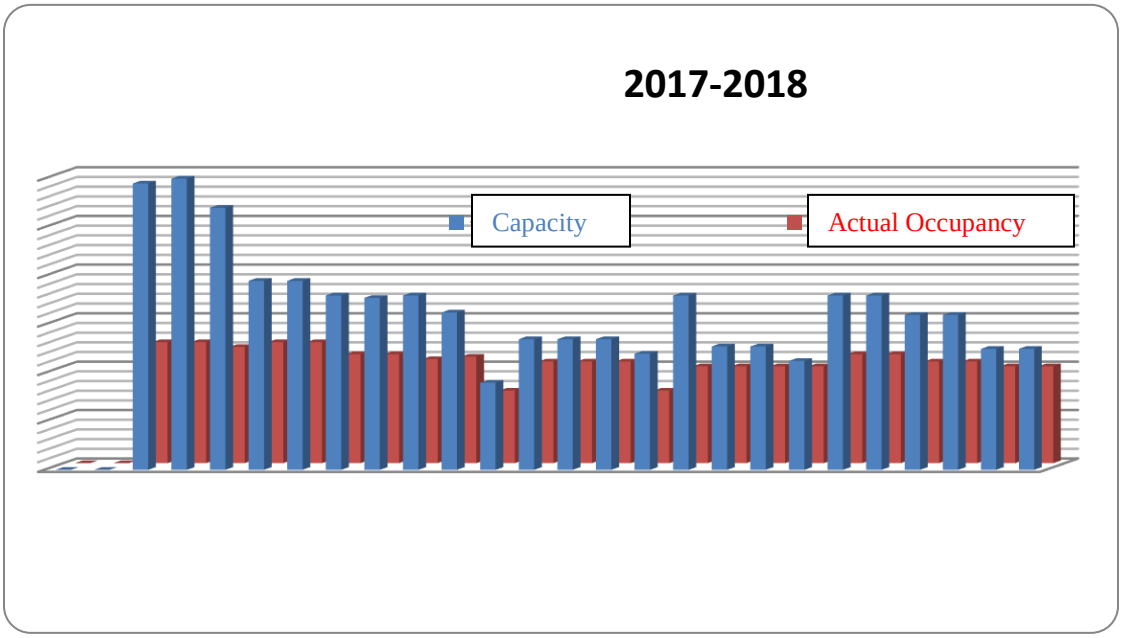
Ateliers: There are two Ateliers (1 and 2) which are furnished appropriately and enough for students and note that the AutoCAD substance was added to the ateliers along with engineering and mechanical drawing.

(Table 7.1) shows the name of classroom with its space, its capacity and the actual occupancy for 2015-2016.

Table (7.1) Classrooms, its area and capacity.

No.	Hall Name	Area m^2	Capacity During the year 2016-2017	Actual Occupancy During the year 2017-2018
1	M04	154	118	50
2	M05	160	120	50
3	M07	135	108	48
4	M10	94	78	50
5	M13	94	78	50
6	M102	82	72	45
7	M103	80	71	45
8	M104	82	72	43
9	M110	74	65	44

10	M205	40	36	30
11	M206	66	54	42
12	M209	66	54	42
13	M210	66	54	42
14	M307	58	48	30
15	B210	82	72	40
16	B207	62	51	40
17	B209	62	51	40
18	B205	56	45	40
19	B202	82	72	45
20	B201	82	72	45
21	B307	72	64	42
22	B308	72	64	42
23	Atelier1	100	50	40
24	Atelier2	100	50	40



Form (7-1) Shows the Capacity of the school halls and its Actual Occupancy.

Laboratories

There is in the Department of equipment and machines Engineering about (26) Laboratories and two workshops distributed in two buildings M and B.

Table (7-2) shows the names of laboratories for each stage and specialization with the capacity and the actual occupancy. As though Supplement (7-4) shows the names of laboratories, size, and number of labs. Devices, themes served by the laboratory for each of them and the needs of laboratory devices.

The lab is being supervised by a faculty member who undertakes the theoretical side while the practical side is under the responsibility of lab engineer but under the supervision of the teacher. The policy in the laboratory imposes the presence of CYCLE for each stage divided the number of students on the basis of (A, B, and C) aggregates, each group enters given lab in a week and is given the theoretical part of the experience, and most of which is complementary to the theoretical lectures in the stage curriculum and specialization in which the student then has made the practical part, taken readings and performed calculations with a model of the solution and draw diagrams and discussed them. The number of given tests for each lab rang from (7-4) experiment during the school year and (8-12) exercise for programming and computers laboratories. There is a comprehensive examination on all tests and exercises at the end of the school year and the degree of the laboratory is the rate of total degrees of reporting and discussing all experiments.

It should be noted that the laboratory devices are not only old, but also the good ones return back to eighties. The urgently acceleration of the technological processions has created devices more sophisticated and efficient at the lowest cost and power consumption which include the possibility of compatibility with other devices.

There is also models in some laboratories that increase the knowledge of students, for example: (cross-sections for some parts of the engines. laboratory devices are maintained by the maintenance unit of the department and there are new devices added to the preliminary and graded studies laboratories during the past three years. purchased huge Steam Boiler was purchased for steam laboratories and steam stations during the academic year 2011-2010. It should be noted also that there is guidance stated that graduation projects and graduate studies should have carried ideas for devices to be used in laboratories and testing. There are cultural relations with other Iraqi universities, whether governmental or civil or institutions of higher education and scientific research to give assistance to their students and researchers in using these laboratories. Modern lab devices have been bought for the different department disciplines and is being planned to buy more during the coming years until renovating all laboratories with academic apparatus similar to those in the world universities.

Also the committees, divisions, units and some laboratories are provided with a computer desktop or laptop.

Table (7.2) illustrates lab. Names and their capacity and the actual occupancy for each stage.

	Lab-Name	stage	topics served by laboratory	specializations	area (m^2)	capacity during 2015-2016	actual occupancy during 2015-2016
1	Mechanics	First	Mechanic I. II	all	41	15	14
2	Heat (1)	First	Heat	all	42	14	14
3	Electricity	First	Electricity	all	20	14	14
4	Heat (2)	second	Heat (2)	all	300	14	10
5	Materials resistance	second	Resistance	all	41	15	10
6	Fluid (1)	second	Fluids	all	198	15	10
7	Conditioning	third and fourth	Conditioning	General Conditioning	65	15	12
8	Combustion engines	third	Combustion	All except aircrafts	145	10	12
9	programming	first	Fortran + CAD	All with drawing	30	12	12
10	Theory of Machines	third	ALL machines except auto	all	55	12	10
11	heat transfer	third	heat transfer	all	52	10	10
12	Fluids (2)	third	Fluids	all	198	15	10
13	control	fourth	control	all	45	10	11
14	vibrations	fourth	vibrations	All except Auto	45	10	11
15	gases	Third and fourth	Dynamics gases	Aircraft and general	36	12	11
16	stations	fourth	steam stations	general	300	15	**12**
17	programmable 4	fourth	CAE	all	36	12	12
18	air conditioning workshop	fourth		air conditioning	-	10	12
19	freezing	fourth	freezing	air conditioning	65	15	12
20	aircraft engines	fourth	pay	aircrafts	36	10	9
12	Aircraft Maintenance	fourth	maintenance	Aircrafts	36	10	9
22	Dynamic plane	fourth	Dynamic	Aircrafts	36	12	9
23	Combustion processes	fourth	Combustion processes	All except aircrafts	145	10	9
24	Theory of vehicles	third	Theory of vehicles	Auto	11	12	8
25	Programming 3	third	Solid work+ analyzes	General mechanics	38	12	12
26	Programming	second	CAD+Matlab	All except drawing	-	12	12
27	Technology equipment	Third forth	Technology equipment	all	35	25	25
28	Laboratory workshop graduate studies	M.Sc. - Ph.D.	Topics pertaining Engineering Branches	all	30	10	4

Library

Library of department is the oldest scientific library in the University of Technology which was established since the founding of the Institute of Higher Industry in 1960 and the department in equipment and machines engineering, also has special Hall in the Central Library of the University of Technology, as well as IVSL library, and the modern electronic library in which work has been started since 2007 - 2006, in addition to free-book store.

- Department Library

The area of this library is (100) m^2 and is used by students of graduated and preliminary studies and faculty. It has (26) racks of different sizes with two-and three suites which include many titles of books in Arabic and English, besides thesis, magazines and periodicals. The library is managed by three specialized employees using a database and it contains one reading room furnished and air-conditioned. (Table 7-3) shows the number of books, magazines, periodicals, thesis and CDs.

Table (7-3) shows the number of books, magazines, periodicals, thesis and CDs

CD		Thesis, MSc. – Ph.D.		Periodicals		Magazines		Total number of books	
No.	Type	No.	Type	No.	Type	No.	Type	No.	Type
4	**4**	**769**	**37**	**587**	**587**	**-**	**-**	**4325**	**2203**
During the year 2015-2016									
foreign	Arabic	foreign	Arabic	foreign	Arabic	foreign	Arabic	foreign	Arabic
-	-	**5**	**8**	1	10	1	5	113	-

• Type means (one title) and the number refers to (number of copies per title).
• The total number of types is (2805) and the number (5659) includes (267) Arabic Book, (2078) English book. The number of periodicals is (454) Arabic and (133) English.
• The number of masters and doctoral thesis is (756) for both of the type and number added during the current academic year.
• Library Services are dedicated to the employees of the department and the university and students of preliminary and graduate studies.

- Central Library

The University of Technology has a large building related to the Central Library composed of 4 floors each floor boasts two halls and each of which covers an area of approximately 400 square meters. It depends on an electronic system - League decimal catalogs – for indexes, titles, authors, publishing houses and the number of prints.

This library Includes suites relating to the scientific and engineering branches such as a special suite for the department of equipment and machines engineering which has (1600) Arabic Book, (3077) English, (988) thesis and (250) titles of periodicals and magazines. These books can be borrowed by preliminary & graduated studies students and the employees equally through using participation identities for limited period.

- IVSL Library

It is an electronic library dedicated to graduate students, faculty and researcher s and managed by IT center through allocating a user name and password through which the researcher can enter this library and take advantage of their sources.

- Electronic Library

After collecting books, research, Periodicals and thesis in an independent external storage unit, the contents are arranged and renamed to groups, each group inside a file to facilitate the search process as in the following way:

o putting all the engineering and scientific books into portfolio.
o putting all thesis within the thesis portfolio.
o putting all the images within the image's portfolio.
o putting all the engineering programs within the program's portfolio.
o putting all the scientific conferences within the conference's portfolio.
o putting all research within the research portfolio.

Scientific journals have been kept within the research file, considering putting the name of the magazine and the date of issuance on each file.

- Free Books Store

It Includes textbooks for all stages and specializations and has an area of about (125) m^2 and (30) racks holding (2090) books, most of them are in good condition and the rest is in a lower condition than those. Table (7-4) and (7-5) show the ratio of the number of books to under-post graduates, titles and books numbers. The books will be distributed free of charge at the beginning of the school year and being received from the students to be kept at the book store before announcing the results. The percentage of free books distribution for education at the current year is 85% which is the same as the last year. The distribution of books to the students of the second round is being done in the light of their final results and restored them before announcing the results of the second round.

Table (7-4) number of students, used books and their rate

	Students No.	Type of study	Used books No.	ratio
1	**720**	Preliminary	**2090**	**%75**
2	**414**	top	**5659**	**%85**

Table (7-5) Number of titles and books

Copies No.		Titles No.	
English	Arabic	**English**	Arabic
1010	**1080**	**20**	**12**
2090		**32**	

- Internet Unit

At the University of Technology, there is a Center of Information and Communications Technology which provides all its scientific departments and research centers with internet service (WIRELSS NETWORK) by distributor (ROUTERS). Buildings stories and the offices of the teaching staff are supplied with lines, where there is one system in the department which includes (96) lines.

There are (204) desktop computers, (115) laptops, (107) of which are for faculty as well as there are (91) desktop computers, (15) laptops used for administrative and service purposes– administrators, technicians, scattered (2) Laptops, (204) office Computers (41) Computers added this year, as well as (113) desktop computers dedicated for programming laboratories.

Table (7-6) shows the number of computer devices of under-post graduates and their ratio.

No.	Students No.	Type of study	computers No.	ratio
1	720	Preliminary	113	%100
2	144	top	19 for teachers and Internet unit	%100

The internet unit was established in 2004 to be distinct gate for the mechanical engineering department. This service was being provided in limited way at the beginning where there were ten computers, then this service was increased gradually to include (wireless) service for all teachers to provide their services to employees and students (under graduate, post-graduate, researchers). This unit provides other services, including:

1 - Helping students in the process of search and getting research and reports.

2 - Teaching students to use computer and the questions relating to programs and installation.

3 - Providing printing service for research and reports on papers.

4 – Providing research registration service on discs and copying CD.

5 – Providing scanner service for papers.

6 - Providing Internet service to students.
7 – Providing (wireless) service for all department teachers.
8 - Helping teachers and employees through providing computers maintenance and installation of software.
9 - Providing email service to the department which provides communication between the connected party from inside and outside Iraq, and the presidency of the department as well as responding all queries and answers.

- Department Website

Website was set up in 2007 and was developed gradually.
Through this website, can do the following functions:
1- Publishing the latest news and activities of department.
2- Defining cadre of the department and identify its branches.
3- Identifying the department curriculum of the four branches.
4- Disseminating lessons lectures on the department site.
5- Disseminating questions of previous years.
6- Disseminating rapid news and announcements on the site.
7- Informing graduates on dates of receiving their graduation documents in the event of readiness.
8- Disseminating various activities of the department (sessions, conferences, seminars and discussions of graduate students).
9- Disseminating sports activities of the department.
Supplement (6-5) represents the image of the website of the department.

- Printing and Discs Recording

This service includes providing service of copying reports and research as well as helping in the organizing of reports, research and projects besides teaching them how to print, apply orders, typeset and train.

- Computer Labs

These labs develop, sustain and maintain all computers of department including desktops, laptops and private laboratories in addition to installing the educational programs for students and following up the updates from time to time.
- Online in the arena of university
- Students Utilize the Internet in the field of scientific research, reports, and programs that contribute to raising their levels.
- Students Utilize the Internet for continuing and communicating inside and outside the country.

Conference Room

The AEB conference room is used as a faculty meeting room, an interview room and a classroom with modern data show and screens, which is an area (200 m^2) and capacity (100) people

Conclusion:

- The department have two buildings M and B; each one has crypt and (4) floors.
- The total area of the two buildings is (3000) m^2.

- There are 40 rooms used as offices for teachers.
- The total area of the offices is (320) m^2 range from smaller space (5) m^2 and the bigger area of 10 m^2.
- There are (22) classrooms ranging in size from (100) m2, and (250) m^2 and the total area is (2400) m^2.
- Actual Occupancy of classrooms is less than their capacity.
- There are three halls for sessions, conferences and thesis discussion, and the four are dictated for the Council of the department which distributed as follows: (three halls in the building M and its space is (525) m^2 and one in the building B and its area is (100) m^2.
- There are (26) laboratories for 4 stages and their specialties and 2 workshops for the initial and graduate.
- M and B buildings are furnished, air-conditioned, equipped with internet services.
- There is an internal phone network in the department that allows communicating with, laboratories divisions and units by the senior leadership of the department reached to about (12).
- There is (180) computers distributed among programming labs, Internet unit, faculty offices and the unites, division of the high command headquarters and the distributor.
- Wireless LAN Network and (7) ROUTERS and (86) lines.
- (85) Laser printers, (20) colored
- (1600) CD players.
- (550) FLASH RAM.
- (16) copying devices.
- (12) Paper wearing-out devices.
- (70) Bulletin boards distributed throughout the department.
- (62) Large and small conditioners, (4) package conditioners and (76) Split
- (40) Water coolers and (76) refrigerators.
- Pharmacy that contains a first aids and some important medicines (5).
- (146) White Boards of various sizes.
- (9) Vacuum Cleaners.
- (54) Electric heaters and (70) oil heaters.
- Wall clocks.
- (29) Water heaters, (47) air distributors, (16) Mirrors, (8) Cooks, laundry for laboratories, (3) kitchens, (44) heaters and (35) gas bottles.
- (6) Different generators.
- (60) Fire extinguishers and announcements pertaining civil defense published in all floors and courtyards of the department.
- (52) Tanks for storing files.
- (110) iron lockers.
- (13) monitors (DATA SHOW), (4) smart blackboard, (8) TV, (5) Satellites, (3) screens (LCD) and (28) Over Head.
- (2) Emergency stairs.
- (99) Drawing boards.
- (110) Laptop.
- (6) Scanners.
- (270) ceiling fans, (47) vertical fans and (19) wall fans.
- (56) Shelves, (448) fixed and Plastic chairs, (166) stools, (61) swivel chairs, (180) curtains, (15) carpets, (302) various tables and (20) glazed offices.

CRITERION 8. INSTITUTIONAL SUPPORT

A. *Leadership*

The senior leadership of the Department of Mechanical Engineering Department of the Council consists of:

•Head of Department.
• Associate Administrator of the department head.
• Associate scientific head of the department.
• Chairman of the General Mechanics branch.
• Chairman of air-conditioning and freezing branch.
• Head of Automotive Engineering Branch.
• Chairman of aircraft engineering branch.
• Representative of the teachers' union.

B. *Program Budget and Financial Support*

Department of Mechanical Engineering departments like the rest of the budget set by the presidency of the University of Technology, which in turn determine by the Ministry of Higher Education and Scientific Research. Which consist of the following:

• General Budget
• Higher Education Fund
• Evening budget / previously
• Grants and donations
• Expense of private / graduate
•Internet services
• Records of revenues
• Contributions to the Advisory Office
• Contributions in state institutions
• Private sector and civil

C. *Staffing*

The methods used to retain and train staff. And/or Faculty development and professional staff activities, including: attending seminars, lectures, and participate in training workshops and conferences and professional activities of professional writing, and review activities, and make new and innovative research, and training programs inside and outside Iraq include:

1. Study leave (outside the country) is a program that allows for faculty members who have not received a doctorate for a chance to study abroad degree. The Ministry provides tuition, travel, and a monthly stipend. Well also, it includes participation through temporary contracts with the same benefits. Many of the teachers have participated in this program successfully.
2. Center for Continuing Education Center offers professional development and training sessions for faculty members. It requires all new faculty members to obtain a certificate of participation for training in the first year of operation.

3. Sabbatical: leave the university supports the professional faculty (full-time) activity after five years of service. Some faculty members have benefited from this opportunity.
4. Training of teaching staffs out of Iraq in a prestigious international university, according to the Department of Research and Development in the Ministry of Higher Education and Scientific Research Program.

D. Faculty Hiring and Retention

Any process including Hiring or Retention is the responsibility of the presidency of the university in cooperation with the Department

E. Support of Faculty Professional Development

Widened the attention this year to the question of which educational guidance systems so that each of all the stages and terms of reference and an educational guide people.

We are dealing with students and provide advice and guidance to them by the Committee on Student Affairs in the Department of Mechanical Engineering. This Committee is composed of some faculty members and is responsible for advising students and help students on their professional development.

The number of meetings with faculty and with students outside lectures hold times to look at the scientific affairs and university research activities. In addition, it offers advice to students by all faculty members based on experience, guidance and willingly.

PROGRAM CRITERIA

The main goals of Aircraft branch since the beginning of its foundation an extension of the objectives of the University of Technology in the delivery of his message to the scientific community. Branch has several strategic goals, represented by:

1. Preparation of engineering staffs in the specialty of aircraft engineering has a responsibility to build a home and participate in the overall renaissance in line with the needs of the country and the preparation of cultured generation armed with science and adopt a sound basis to bring about radical changes and puts scientific knowledge and scientific way of thinking and analysis in the country's objectives service.
2. instill moral values in engineering for the birth of a new generation and the preparation of an alternative future leaders in the disciplines of engineering of aircraft in addition to instill humanitarian and Islamic values. In addition, work to strengthen the University of Technology's position as the center of radiation creatively to deepen the culture of authentic social values.
3. Work on deepening the balance between the theoretical progress of science and applied aspects between them, as well as focus on the introduction of modern methods of learning system that increase the students' ability to design, creativity and innovation. Raise the level of graduate and diversification and providing various accessories and commensurate with the needs of the country. Moreover, work to link graduate interim needs to plan for sustainable development of the country and respond to the development of appropriate scientific and practical solutions to problems faced by the industrial sector or the development of proposals and controls her.

Program Objective:

The basic objective of the education program in aircraft engineering branch which is compatible with the goals of the University of Technology is to instill and install a solid scientific and practical knowledge in the engineering graduate's basis in addition to the development of the manual and intellectual skills necessary in their professional lives. It was discussed tutorial targets (PEOs) of the section and on an ongoing basis with most of the faculty members in several meetings.

The first objective

Provide a solid foundation for the students in the discipline department and design methodologies by focusing on the application of mathematical, scientific and engineering principles.

The second objective

Given the exceptional circumstances faced by the country necessitated the student's interest in the matter and rehabilitated psychologically and perseverance in achieving the ambition that is the basis of all new through actions within the context of the work in the department. And to provide a sound knowledge of the students from the academic and professional practices in the relevant jurisdiction of aircraft engineering, as well as awareness of the social implications of technologies in aircraft engineering.

The third objective

It focuses on the development and improvement of educational and rehabilitation activities in the department. And it is linked to the importance of applied research and supplementing the theoretical side to side, and the importance of knowledge for students

complete the requirements and sustain through their participation in various aspects of applied both inside and outside the university in the centers and factories and laboratories. In addition, increase the portability of learning, education and skills of the students and work to raise the spirit of development and their creativity.

Program Checkup:

The auditing process and evaluation of the program's educational department through the following channels:

1. Study and evaluation of the student.
2. Discuss the faculty.
3. Study and evaluation of the graduates.
4. Study advice and the opinion of the labor market (industry).
5. Viewing similar experiences and debate in the local and international universities.

And the evaluation of the objectives of the educational program of the Department of process continuously and informally whenever possible through many channels, such as views and questionnaires graduates, the views of faculty and student members and the views of experts from employers and industry ... etc., starting from previous years, as it has been conducting systematic documentation each of these views and questionnaires and then analyze and evaluate this data by the administration and faculty members to determine whether there was a need for changes in the support tutorial.

Table 8.1 of the Annual income and expenditures for the academic program.			
No. of item	***Items of financial resources and sources***	***Amount in Iraqi Dinar***	
1	Total budget allocated to the academic program.	**34165000**	
2	Financial resources and funding sources that academic program depends on them to cover the total annual expenditure.	-	
	Self-funding sources:		
	- Rental Cafeteria	**12040000**	
	- Direct Fees	**1181000**	
	- Wages of Graduation documents	**3986045**	
	- Evening Studies	**800000**	
	Sources of donations and grants:		
	Other sources:		
	-		
3	Total salaries of the teaching staff at the academic program.	**2366558583**	
4	Total salaries of employees in the administrative and auxiliary services	**630823877**	
5	Total additional lectures wages charged by faculty.	**55600000**	
6	Total additional lectures wages charged by external lecturers.	**6420000**	
Paragraphs of the allocated budget exchange		The amount allocated.	The amount spent.
7	Total amounts for the purposes of building maintenance, the hardware, and equipment in the academic program.	**45000000**	-
8	Total amounts for the purposes of equipment, materials, and supplies in the academic program.	**950000**	**200000**
9	Total amounts for the purchase of books, periodicals, and references in academic program.	-	-
10	Total amounts for conferences and seminars in the academic program.	**750000**	**750000**
11	Total amounts for the purposes of scientific research and postgraduate studies in the academic program.	**26965000**	**9600000**
12	Total amounts for the training of teaching staff and employees of the administrative system in the academic program.	-	-
13	Total amounts for the purposes of other expenditures in academic program such as: festivities, scientific or artistic exhibitions... Etc.	-	-
14	Total amounts of the workshops in the academic program.	-	-
15	Total amount of student services in the academic program	-	-
16	Total amounts of scientific dispatch in the academic program.	-	-
17	Total amounts for the purchase of textbooks in the academic program.	-	-
18	Total amounts of incentives and rewards in the academic program.	**250000**	-
19	Total amounts of other than those mentioned in above	**18380000**	**18380000**

Signature Attesting to Compliance

By signing below, I attest to the following:

That Aircraft Engineering has conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET's *Criteria for Accrediting Engineering Programs* to include the General Criteria and any applicable Program Criteria, and the ABET *Accreditation Policy and Procedure Manual.*

___Dr. Abdul Satar Jwad Mohammed _____
Dean's Name (As indicated on the RFE)

_____ _____
Signature **Date**