

**ABET  
Self-Study Report**

**for**

**Energy and Renewable Energies Engineering  
Program**

**at**

**Electromechanical Engineering Department  
University of Technology  
Baghdad, Iraq**

**July 1, 2016**

**to**

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

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## 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 Electromechanical Engineering Department:**

The first beginnings of the department return back to the year 1960 when established under the name of (High Industrial Institute) and one of its aim was to graduate the industrial lecturers and technical trainers.

In the year 1973-1974, this institute was changed to a new department which opened under the name of (Industrial Lecturers Department) with two branches (Electrical and Mechanical Branch) and later in 1977 a third branch was added as (Construction Branch)

and continued to work until 1989 when the acceptance of students in this department was stopped.

In the year 1993-1994 the department was renamed to (Technology Education Department) instead of (Industrial lecturers department) with two branches (Electrical and Mechanical Engineering Branchs) in addition to some lectures in the program of Technology Education. In 2007-2008, the name and title of the department was changed to (Electromechanical Engineering Department), which is considering as a modern engineering disciplines that combine specialized Electrical and Mechanical Engineering, where Electromechanical Engineer deals with electrical equipment and systems for the operation of mechanical devices and these disciplines is an urgent need in the different industrial sectors.

The department consists of three branches or three programs, namely:

- 1-Energy and Renewable Energies Engineering Branch.
- 2-Electromechanical Systems Engineering Branch.
- 2-Navagation and Guidance Engineering Branch.

#### **About Energy and Renewable Energies Engineering Branch:**

Energy Engineering Branch was established in the Electromechanical Engineering department during the year 2007-2008, then its name was changed to Energy and Renewable Energies Engineering in 2013. The program specializes in graduation of applied engineers after four years of study in the jurisdiction of Energy and Renewable Energies Engineering where graduated students have familiarity and knowledge in related electrical and mechanical engineering at the same time.

The Bachelor of Engineering is a professional degree that allows graduates of the program to register in the Iraqi Engineers Association and practice the profession directly after graduation. The four-year program included one year's study common to the major, covering basic science and engineering topics courses besides the general education topics, and then three years of specialization in Energy and Renewable Energies Engineering. The curriculum was also developed to satisfy the Iraqi requirements for licensure.

The program prepares students for different types of conventional energy and renewable energies like solar, wind, bio and other kinds of renewable energies with energy efficiency course.

#### **C. Options**

The program offers only bachelor's degree in Energy and Renewable Energies Engineering /Electromechanical Engineering Department.

#### **D. Organizational Structure**

Administrative structure from lower to upper administration:

Chair (Energy and Renewable Energies Engineering Branch), Dean (Electromechanical Engineering Department, Chancellor (University of Technology).

### **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 with the exception of 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 is completely offered in the main UOT campus in Baghdad.

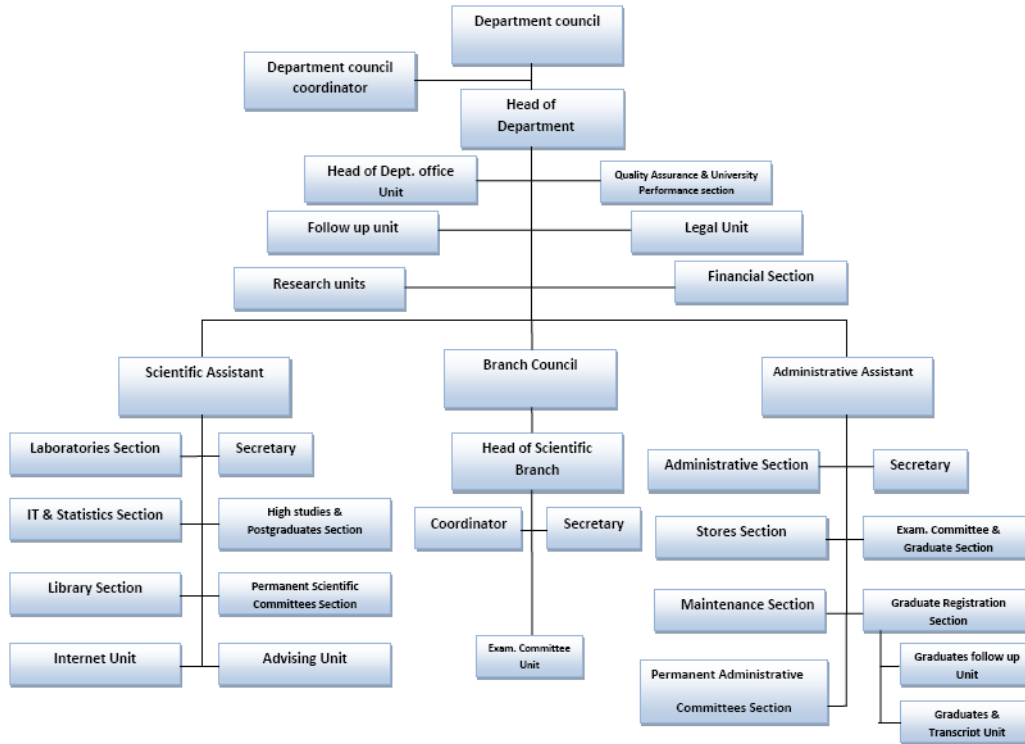
### **G. Deficiencies, Weaknesses or Concerns from Previous Evaluation(s) and the Actions Taken to Address Them**

This will be the first evaluation by an ABET evaluation team.

### **H. Joint Accreditation**

The Energy and Renewable Energies Engineering Program is jointly accredited by Mechanical and Electrical Engineering criterias, but it is not seeking joint accreditation by more than one commission.

### **Organizational Structure**



## CRITERION1. STUDENTS

### A. Student Admissions

- 1- To be accepted for an undergraduate degree in Electromechanical Engineering Department, applicants must hold the official Iraqi Secondary School Certificate. The Ministry of higher Education and Scientific Research controls and distributes electronically the admissions of students in the governmental institutions and faculties according to their grades from the Secondary Schools, and these are some of the most important requirements for controlling the accepting of students:
  - A- To be Iraqi nationality and born on 1991 and up.
  - B- Have a certificate from an Iraqi secondary school authorized from the ministry of education.
  - C- Have a medical certificate to ensure that he is qualified.
  - D- Be a full-time study.
  - E- Not to be acceptable and continues to study in another college.
  - F- Non-Iraqi students (arrivals) who obtained a certificate of an Iraqi secondary school admitted according to the central acceptance.
  - G- Admission 10% of the top graduates of technical institutes.
  - H- Acceptance of talented student.

2- When student or applicant was admitted in UOT / in the appropriate department according to his grades, then the department will also distribute and register him in the scientific branches of department with priority according to:

- His grades.
- His wish to register in the suitable branch.

3- The above mentioned sequence is documented and must be followed by written rules in which a special committee is formed and consists of some experienced academic staff with head of registration division in the department to perform the admission and distribution of new students in the appropriate branch.

No	Graduate Year	Enrolled
2	2011-2012	91
3	2012-2013	79
4	2013-2014	70
5	2014-2015	66
6	2015-2016	110

No	Graduate Year	Admission Average
1	2014-2015	Min:88.43 to 90.57
2	2015-2016	Min:87.86 to 92.03
3	2015-2016 special Admission	85.86

## B. Evaluating Student Performance

The Evaluation process and assessment measures are as follows:

Subject with lab.	Midterm 10% + 5% continuous evaluation	Second Midterm 10% + 5% continuous evaluation	10% lab. evaluation	Final Exam 60%	Final Grade 100%
Subject without lab.	Midterm 10% + 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 Exam 50%	Final Grade 100%
Project	Discussion 25% + 15% evaluation		N/A	Discussion 35% + 25% evaluation	Final Grade 100%

Students who were not able to attend the relevant final examination are allowed to take a second attempt exam. Students who were not able to attend the relevant second attempt examination because of conditions out of their control (due to security and violence issues) are allowed to take a third attempt exam (only by the permission of Ministry of Higher Education & Scientific Research). If the student fails to pass the last attempt (third attempt) Students who were not able to attend the relevant final examination are



allowed to take a second attempt exam. Students who were not able to attend the relevant second attempt examination because of conditions out of their control (due to security and violence issues) are allowed to take a third attempt exam (only by the permission of Ministry of Higher Education & Scientific Research). If the student fails to pass the last attempt (third attempt) and fails to get 50%, he/she will be considered as (FAIL) in that course. The student allows to take two failed courses to the next level, but if he/she failed in more than two courses, the student has to repeat the academic year. Fail to succeed two successive years, he/she dismiss from the university.

### **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>)

### **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.

#### **E. Work in Lieu of Courses**

N/A

#### **F. Graduation Requirements**

The graduation requirements for the initial study is complete theoretical and practical study for four years and by units planned and complete the summer training study plan during the study period and the completion of a graduation project to link the teaching curriculum decision.

#### **Transcripts of Recent Graduates**

Transcripts of recent graduates will be provided to Team Chair when requested

## **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 Electromechanical Engineering Department:**

Prepare specialists in the field of electro-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.

### **B. Program Educational Objectives**

The program educational objectives of Energy and Renewable Energy Engineering are:

**Objective 1:** Preparing engineers efficiently specialists in the field of Energy and Renewable Energy Engineering and able to develop their skills in the fields of engineering knowledge.

**Objective 2:** Apply engineering knowledge and skills to make positive impact on society through employment in industry, advanced study, and/or public services.

**Objective 3:** Energy and Renewable Energy Engineering graduates as professionals in the various fields of energy engineering and known professional and ethical responsibilities in implementing sustainable engineering solutions.

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

The program educational objectives of the Energy and Renewable Energies Engineering branch are consistent with the mission of the branch. To summarize this mapping between program educational objectives and the mission statements:

1- Program Educational Objectives 1 and 2 are consistent with the mission of meeting high standards of student success by providing access to a learner-centered, high quality educational program.

2- Program Educational Objective 3 is consistent with the mission of producing graduates that are prepared for advanced education and life-long learning and therefore capable of engaging in the process of research and scientific discovery for the benefit of local, regional and global communities.

### **D. Program Constituencies**

The main constituencies of the Energy and Renewable Energies 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) Branch members:**

Branch 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 Branch 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 Branch, Departmental and University levels. The personnel provide administrative and technical support. Their tasks include overseeing the up keeping of branch, 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. Many other staff members contribute to the support of the energy and renewable energy engineering; these include all laboratory technicians and staff from other departments, IT unit personnel, and others.

### 4) **Alumni:**

Alumni are clearly influenced by the branch reputation, as this would help them advance their careers. They frequently contact faculty for recruitment purposes. Finally, the branch 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:**

The Energy and Renewable Energies Branch has an Industrial Advisory Council (IAC). The IAC, which is currently composed of 9 industry leaders from various sectors in the field of Engineering, meets twice a year and have played an important role on curriculum changes and continuous improvement of the EREE Program based on the current and future needs of industry. The fall meeting features an Undergraduate Forum, where the council members address and discuss important engineering issues with the students. At the spring meeting the primary role of the council is to evaluate and critique the Capstone Design Presentations. The Council is an objective body within EREE that ensures the department's continuous commitment to anticipate and surpass new academic challenges set forth by an evolving industry. The board experts are:

1- Dr.SamihKahtanJawad, Ministry of Industry & MineralsState Company for Automobile industries and equipments, email: [samihkhtan@yahoo.com](mailto:samihkhtan@yahoo.com).

2-Dr.SarmadDhiaRidha, Ministry of Electricity Manager of South Baghdad thermal power station (Middel production) GEEP, email: [dr.eng.sarmad@gmail.com](mailto:dr.eng.sarmad@gmail.com), 07704848475,07827808775.

3- Dr.NazarN.Kadham, Ministry of ElectricityProduction Office Gas stations Dept. Head of North Iraq &Salahaldeen, email: [nazarnimma1981@gmail.com](mailto:nazarnimma1981@gmail.com),07815288699, 07901921990.

4- Dr.Mohammed Ahmed Salih, Ministry of Electricity, dr\_masalih\_abutaeb@yahoo.com.

5-Dr.Hasanen Mohamed Hussain Ali, University of Technology,Manager of Scientific & Engineering Consultant Bureau, PhD.in Mechanical Engineering &Airconditioning, email: [dr.hasanen-hvac@yahoo.com](mailto:dr.hasanen-hvac@yahoo.com), 079018322138, 07707879813.

6- Eng. Amer K.Kasim, Ministry of Electricity, General Directorite of Alrussafa Electricity Distribution, 07901280798.

7- Eng.Majid Mohammed Abbas, Ministry of Electricity, Director ofRegulatory Department Planning & Studies Department, email:32\_regulatory@moelc.gov.iq, 07809196850.

8-Eng.JalilJafer Ali, private sector, Maintenance Manager of Iraqi Company for Cartoon Industry, email: [jalil@yahoo.com](mailto:jalil@yahoo.com), 07706282010.

9- Eng.ZadinKhalefaIzghair, Ministry of Industry & Minerals, General Company for textiles and leathers industries, Deputy Project Manager, 07902491598.

### **E. Process for Review of the Program Educational Objectives**

The Energy and Renewable Energies Engineering program Educational Objectives have been reviewed according to the need of labor market and rapid technology development in Energy and Renewable Energies to match the mission of the program.

These objectives have been reviewed by the advisory Industrial Board of the department who agreed to change to the following:

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

## **CRITERION 3. STUDENT OUTCOMES**

### **A. Student Outcomes**

Students from the Energy and Renewable Energies 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.

It is noted that the initial Student Outcomes of the Energy and Renewable Energies Engineering (EREE) program began with the same set of the ABET Criterion 3 Student Outcomes (a) through (k). It has been carefully reviewed whether the Student Outcomes are properly linked to our Program Educational Objectives and also whether our students would be well prepared to achieve the Program Educational Objectives in future practice, if they attain the Student Outcomes by the time of graduation. Through the ongoing review and assessment process, no need for additional outcomes has been identified. However, the Student Outcomes were slightly modified by specifying the Energy and Renewable Energy Engineering components into some of the outcomes in the end of 2015-2016. Since then, minor revisions on the Student Outcomes have been made reflecting the changes in the ABET Criterion 3.

### **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 EREE 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 Contribution of Required Courses to Student Outcomes**

Subject code	a	b	c	d	e	f	g	h	i	j	k
EMEE 111									•		
EMEE 122	•	•			•		•				•
EMEE 123	•				•						
EMEE 124				•		•			•		
EMEE 125	•				•						
EMEE 136	•	•			•						•
EMEE 137	•		•		•						
EMEE 138	•	•						•			
EMEE 139	•	•							•		•
EMEE 211						•			•	•	
EMEE 222	•	•									•
EMEE 223	•				•			•			
EMEE 234	•	•									•
EMEE 235	•	•			•						•
EMEE 236	•	•									•
EMEE 237		•	•					•	•		•
EMEE 238		•	•					•	•		•

EMEE 239	•	•			•						•
EMEE 321					•			•	•		
EMEE 322	•	•			•		•			•	•
EMEE 323	•							•			
EMEE 334		•	•				•	•		•	•
EMEE 335		•	•						•		•
EMEE 336	•	•	•		•			•	•		•
EMEE 337		•	•					•	•		•
EMEE 338	•				•	•		•		•	
EMEE 339	•				•	•		•			
EMEE 431	•	•			•			•			•
EMEE 432	•	•				•	•		•	•	•
EMEE 433	•	•			•	•		•	•	•	•
EMEE 434						•					
EMEE 435	•	•			•		•	•	•	•	•
EMEE 436	•		•		•	•			•	•	
EMEE 437			•	•		•	•				
EMEE 438	•			•				•			

EMEE: Electromechanical

#### CRITERION 4. CONTINUOUS IMPROVEMENT

The assessment and evaluation process of the Energy and Renewable Energies Engineering (EREE) program consists of two separate systems; one for the Program Educational Objectives (PEOs) and the other for Student Outcomes (SOs). The assessment and evaluation results are used for continuous improvement of the EREE curriculum and also used to revise and update the PEOs and SOs as needed. It is noted that the EREE faculty and Industrial Advisory Council (IAC) play an important role in the annual review and assessment process.

##### A. Program Educational Objectives

The EREE Program utilizes feedback from the alumni and employers of our graduates to assess achievement of the Program Educational Objectives (PEOs). Both of the alumni survey and the employer survey were conducted at the end of the year 2015-2016. The PEOs at the time of the 2015-2016 are listed below. The educational objectives of the undergraduate program in ERE Engineering are to produce graduates who (during the first several years following graduation):

**Objective 1:** Preparing engineers efficiently specialists in the field of Energy and Renewable Energy Engineering and able to develop their skills in the fields of engineering knowledge.

**Objective 2:** Apply engineering knowledge and skills to make positive impact on society through employment in industry, advanced study, and/or public services.



**Objective 3:** Energy and Renewable Energy Engineering graduates as professionals in the various fields of energy engineering and known professional and ethical responsibilities in implementing sustainable engineering solutions.

For the 2015-2016 alumni survey, alumni who graduated between 2011 and 2016 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.

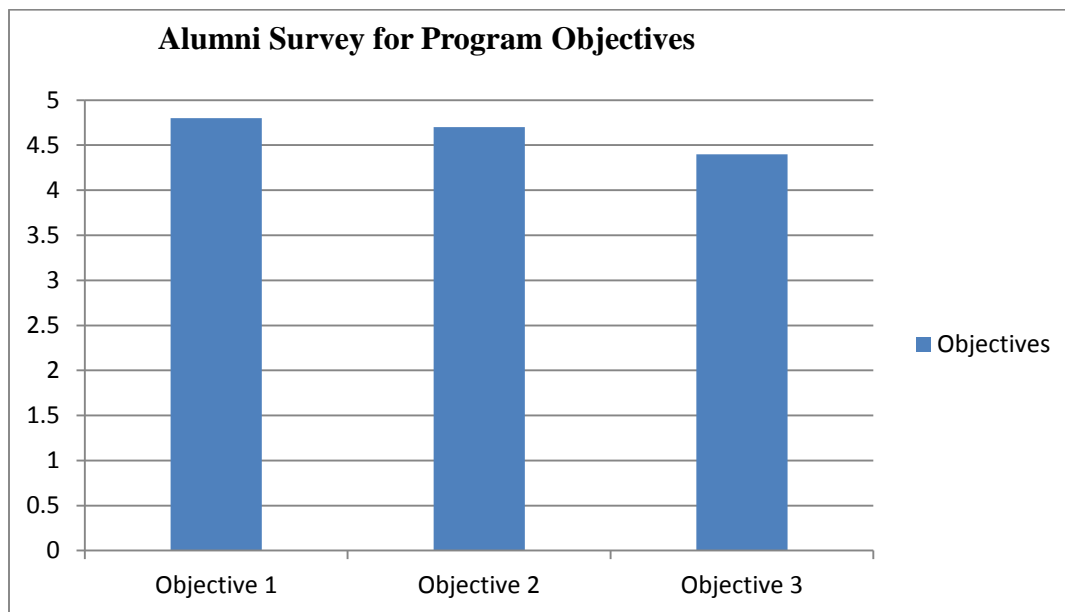


Fig. 4.1 Alumni survey for program Objectives

The survey results were discussed at the EREE faculty meetings during the May 2016. 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 2016.

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.

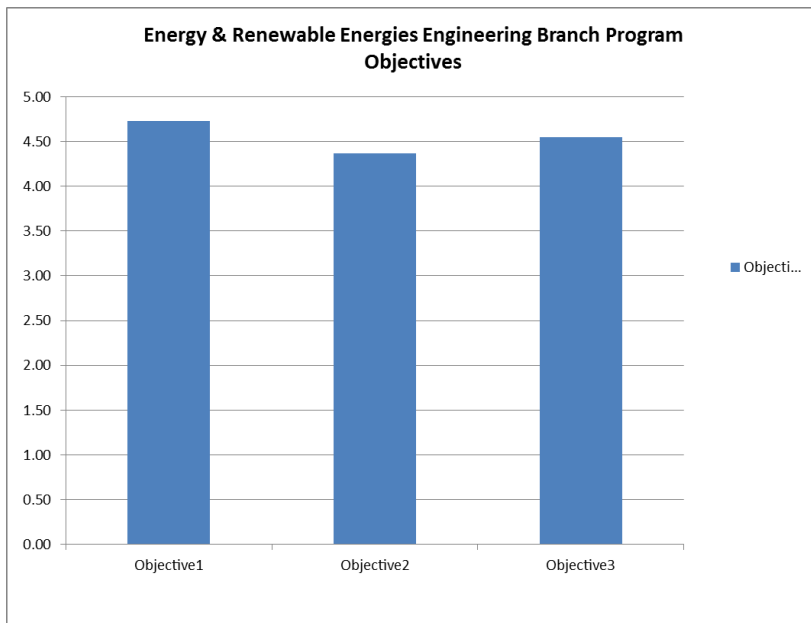


Fig. 4.2 Employers survey

Our PEOs were revised at the end of 2015-2016 PEOs by our constituents. The PEOs were assessed and evaluated through the alumni and employer surveys during the 2015-2016. The revised PEOs are listed below. The educational objectives of the undergraduate program in Energy and Renewable Energies Engineering are to produce graduates who (within a few years of graduation):

1. Successfully practice the energy and renewable energies 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 energy and renewable energies engineering or a related field if pursued.

## B. Student Outcomes

### B.1. Assessment and Evaluation Process of the 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 EREE ABET Coordinator oversees all the assessment process while the EREE Undergraduate Committee discuss the assessment results and recommend the

possible actions for improvement to the EREE faculty. The two assessment methods for the assessment and evaluation of Student Outcomes (SOs) are briefly described below.

## **B.2. Course Assessment**

Table 4-1 illustrates which SOs are addressed by the required EREE 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 EREE courses, our students will be trained to achieve the SOs. The assessment results for the 2014-2015 and 2015-2016 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. Fig. 4.3 shows the results of the two attempts for 2014-2015, where all student outcomes pass 60% in the second attempt. Fig. 4.4 shows the results of first attempt for 2015-2016. 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**

Subject code	a	b	c	d	e	f	g	h	i	j	k
EMEE 111									•		
EMEE 122	•	•			•		•				•
EMEE 123	•				•						
EMEE 124				•		•			•		
EMEE 125	•				•						
EMEE 136	•	•			•						•
EMEE 137	•		•		•						
EMEE 138	•	•						•			
EMEE 139	•	•							•		•
EMEE 211						•			•	•	
EMEE 222	•	•									•
EMEE 223	•				•			•			
EMEE 234	•	•									•
EMEE 235	•	•			•						•
EMEE 236	•	•									•
EMEE 237		•	•					•	•		•
EMEE 238		•	•					•	•		•
EMEE 239	•	•			•						•
EMEE 321					•			•	•		
EMEE 322	•	•			•		•			•	•
EMEE 323	•							•			
EMEE 334		•	•				•	•		•	•
EMEE 335		•	•						•		•
EMEE 336	•	•	•		•			•	•		•
EMEE 337		•	•					•	•		•
EMEE 338	•				•	•		•		•	
EMEE 339	•				•	•		•			
EMEE 431	•	•			•			•			•
EMEE 432	•	•				•	•		•	•	•
EMEE 433	•	•			•	•		•	•	•	•
EMEE 434						•					
EMEE 435	•	•			•		•	•	•	•	•
EMEE 436	•		•		•	•			•	•	
EMEE 437			•	•		•	•				
EMEE 438	•			•				•			

**Table 4.2 Summary of Courses Performance**

<b>Courses</b>	<b>Grades of 2014-2015</b>	<b>Grades of 2015-2016</b>
EMEE 111/ English Language	66.51	72.93
EMEE 122/ Computer Science	63.16	58.92
EMEE 123/ Mathematics	62.16	55.09
MEE 125/ Engineering Physics	66.09	60.53
EMEE 136 /Fundamental of Electric Engineering	58.39	56.17
EMEE/137 Engineering andMachine Drawing	59.39	59.53
EMEE139/ Engineering Mechanics	54.51	52.71
EMEE138/Thermodynamics	55.46	52.71
EMEE124/Workshop Training	70.74	70.40
EMEE 211/ Human Rights, Freedom and Democracy	57.95	57.09
EMEE 222/ Advanced Programming	63.85	63.50
EMEE 223/ Mathematics	57.02	51.53
EMEE 234/ Measurements and Devices	53.71	54.14
EMEE 235/ Electric Circuits	55.31	55.03
EMEE /236 ElectricalMachines	64.27	61.90
EMEE /237 Fluid Mechanics	62.42	53.78
EMEE /238 Heat Transfer	57.32	59.57
EMEE 239/ Theory ofMachine	62.51	61.12
EMEE 322 / Application of Advance Computer	69.78	71.15
EMEE 323/ Numerical&Engineering Analysis	68.87	58.69
EMEE 334/ Control Theory and vibration	56.39	56.59
EMEE 337/ Power Plants	54.73	62.15
EMEE335/ Combustion and Air Pollution	60.9	65.69
EMEE 336 / Fluid Machinery	63.36	57.76
EMEE321/ Industrial Engineering	64.6	61.80
EMEE 338 / Principles of Power Systems	59.91	57.78
EMEE 339 / Protection Systems with Applications	58.48	64.49
EMEE 431/ Electromechanical Systems and Devices	59.76	65.31
EMEE432/ Theory of power system	61.76	66.41
EMEE433/ Theoryof HighVoltage Engineering	73.21	63.31
EMEE434/ Nuclear Power Plant	62.71	62.18
EMEE435/ Power Electronics and Electrical Drives	64.54	61.57
EMEE 436/ Power plant Operation and Maintenance	70.64	64.26
EMEE /437 RenewableEnergy	64.46	63.34
EMEE /438 Project	76.46	81.44

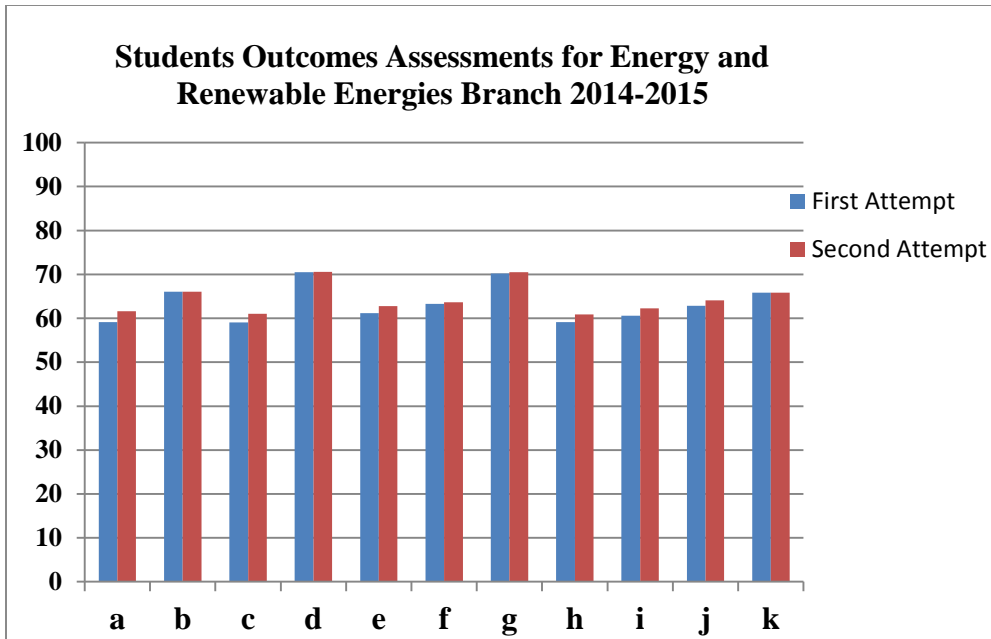


Fig. 4.3 Student outcomes performance through courses for first and second attempts for 2014-2015.

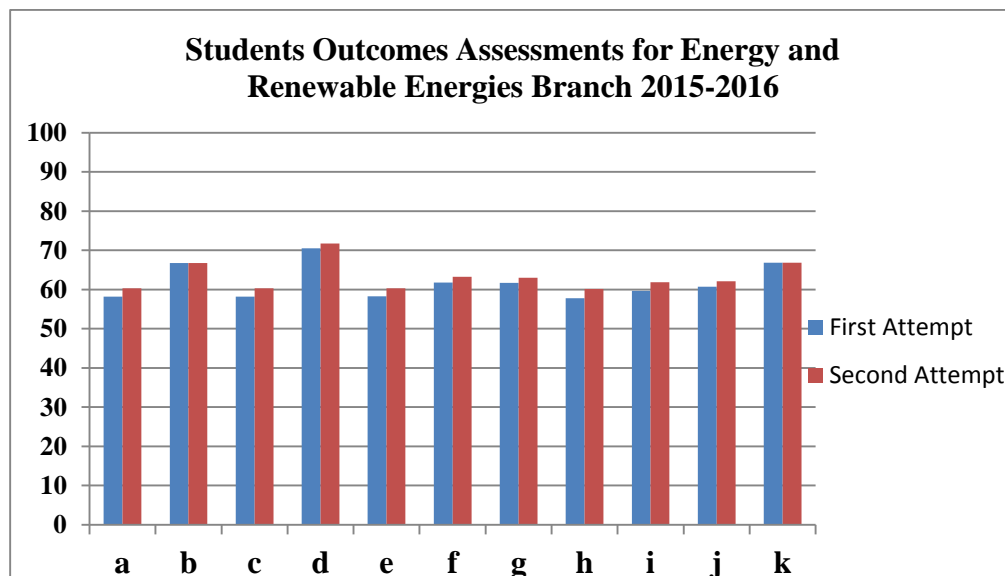


Fig. 4.4 Student outcomes performance through courses for first and second attempt for 2015-2016.

### B.3. Student Outcome Survey at Exit Interview

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 EREE undergraduate program. Figure 4.5 shows the results of the survey with the average scores for each Student Outcome for 2015-2016.

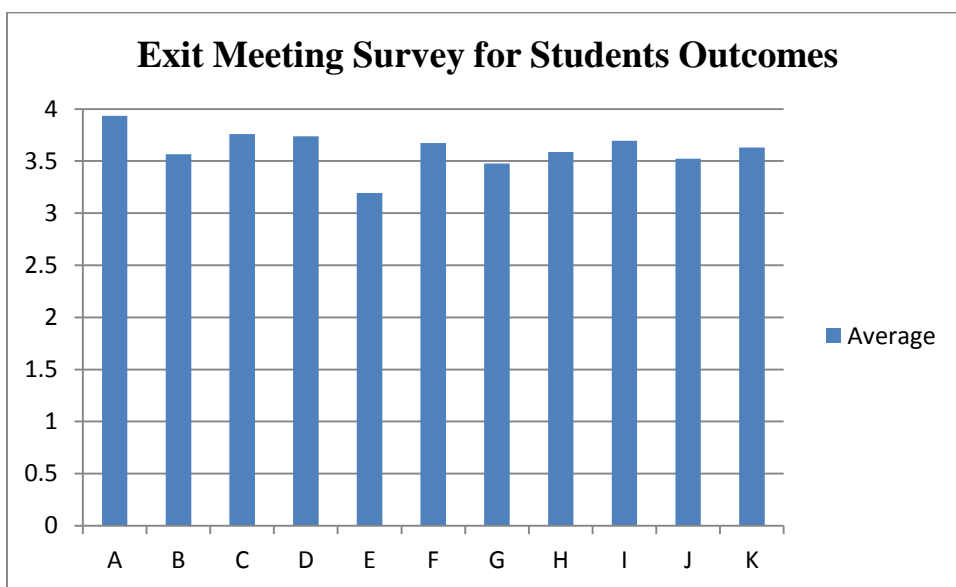


Fig. 4.5 Exit interview survey for student outcomes

### B.4. Alumni Survey

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 EREE undergraduate program. Figure 4.6 shows the results of the survey with the average scores for each Student Outcome for 2015-2016.

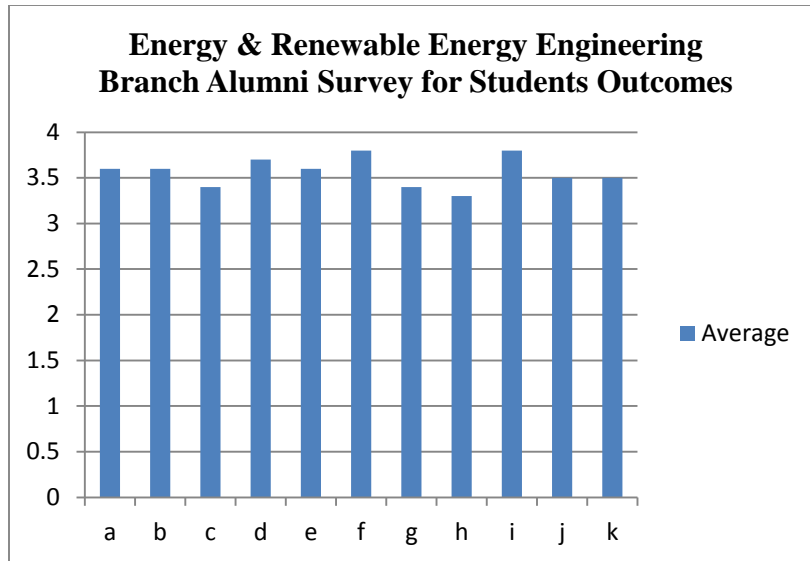


Fig. 4.6 Alumni survey for student outcomes

## C. Continuous Improvement

### C.1. 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 of the alumni survey and the employer survey were conducted in May at end of 2015-2016. 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 EREE faculty meetings and no particular 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 particular 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.

### C.2. 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 2014-2015 and 2015-2016 for courses assessment and 2015-2016 for surveys. The data will analyze by the EREE ABET coordinator during summer. Then, the assessment results are reviewed by the



EREE Undergraduate Committee to recommend possible actions for improvement to the EREE faculty at September faculty meetings.

## **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.

#### **EREE Program Educational Objectives (PEOs):**

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

1. Successfully practice the energy and renewable energy 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 energy and renewable energy engineering or a related field if pursued.

#### **EREE Student Outcomes (SOs):**

Students from the EREE 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 Energy and Renewable Energy 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.4. Prerequisite Flow Chart**

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

#### **A.5. Major Components of the Program**

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

##### **A.5.1. 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 EMEE 123, EMEE 223) on differential and integral calculus. The two courses includes 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. EMEE 323 Numerical analysis with particular applications in numerical differentiation and integration.

EMEE 125/ Physics, 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 (2016-2017), the number of hours will increases to from 16 to 32 hours, each credit hours for Math (I, II, III ) and physics will increase from 4 to 8 hours.

##### **A.5.2. Engineering Topics**

The aim of the program is to graduate students capable to work as mechanical and electrical engineer in energy and renewable energies field. The engineering topics are divided into five parts; preliminary joint courses, mechanical courses, electrical courses and final joint courses.

**Preliminary joint courses:**

1. EMEE124/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 Courses; EMEE122/ Computer Science (Visual BASIC programs), EMEE222/ Advanced Programming (C++), EMEE322 / Application of Advance Computer (Microprocessors and MATLAB languages).
3. EMEE321/ Industrial Engineering, determine the most effective ways for an organization to use the basic factors of production.
4. EMEE137/ 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. Engineering courses are divided into two parts;

**Mechanical Courses,**

1. EMEE139/ Engineering Mechanics, This unit of study aims to provide theoretical knowledge and principles of statics and Dynamics.
2. EMEE239/ 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. EMEE 334/ 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. EMEE138/Thermodynamics, 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. EMEE 237/ 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. EMEE238/ Heat Transfer; teach theoretical basics of the conduction, convection and radiation heat transfer Coincided with a laboratory experiment.
7. EMEE 337/ Power Plants, studying the thermal analysis of the steam and gas turbine plants.
8. EMEE335/ Combustion and air pollution, to explain concept of various forms combustion process & air pollution problem.

9. EMEE 336/ Fluid Machinery, Illustration and discussion the principles of operation for fluid machinery and their types.
10. EMEE434/ Nuclear Power Plant, illustration the principles of Nuclear Power Plant operation and their types, study main four elements of nuclear core, their kinds, and desirable features, study thermal design of the PWR and BWR and study thermodynamic, control of the Nuclear Power Plant.
11. EMEE437/ Renewable Energy, explain concept of various forms of renewable energy (solar, wind, geothermal, bio and other kinds of renewable energies).

### **Electrical Courses,**

1. EMEE136/ Fundamental of Electric Engineering (illustration and discussion the fundamental of 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).
2. EMEE235/ Electric Circuits, in electrical engineering, we are often interested in communicating or transferring energy from one point to another. To do this requires an interconnection of electrical devices. Such interconnection is referred to as an electric circuit.
3. EMEE236/ Electrical Machines, Illustration and discussion the principles of DC and AC machines, description of the machine, as well as its operation in electrical machines.
4. EMEE338/ principles of power systems, Giving Knowledge about the generation, transmission, and distribution type systems.
5. EMEE339 / Protection Systems with applications, Aims through the study of this article to teach and learn the behavior and action of each element of protection in the electrical system and how these elements according to their nature in addition to contributing to this article to find out ways to protect every element of the electrical system.
6. EMEE432/ Theory of power system, illustration and discussion the principles of power system.
7. EMEE433/ Theory of high voltage engineering, illustration and discussion the principles of generation of high DC and AC voltage.
8. EMEE435/ Power Electronics and Electrical Drives, theoretical and practical experiences in the field of power electronics and electrical drives such as AC to DC converters (Rectifiers), DC to AC converters (invertors), DC to DC converters (DC choppers), AC to AC converters (AC voltage regulator and cycloconverter), speed control of DC motors, and speed control of AC motors (inductions and synchronous motors).

### **Final Joint Courses,**

1. EMEE431/ Electromechanical Systems and Devices, this course specification provides the main features of the Electromechanical Systems and Devices.
2. EMEE436/ Power plant operation and maintenance, illustration and discussion the principles of Power plant operation and maintenance.

### **A.5.3. 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 Energy and Renewable Energy Engineering Program set required courses in the general education component as follows:

EMEE 111/ 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.

EMEE 211/ Human Rights, 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.6. 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 electrical 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 EREE faculty members, representatives from industry and EREE 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.7. Cooperative Education**

The EREE 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.8. 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.

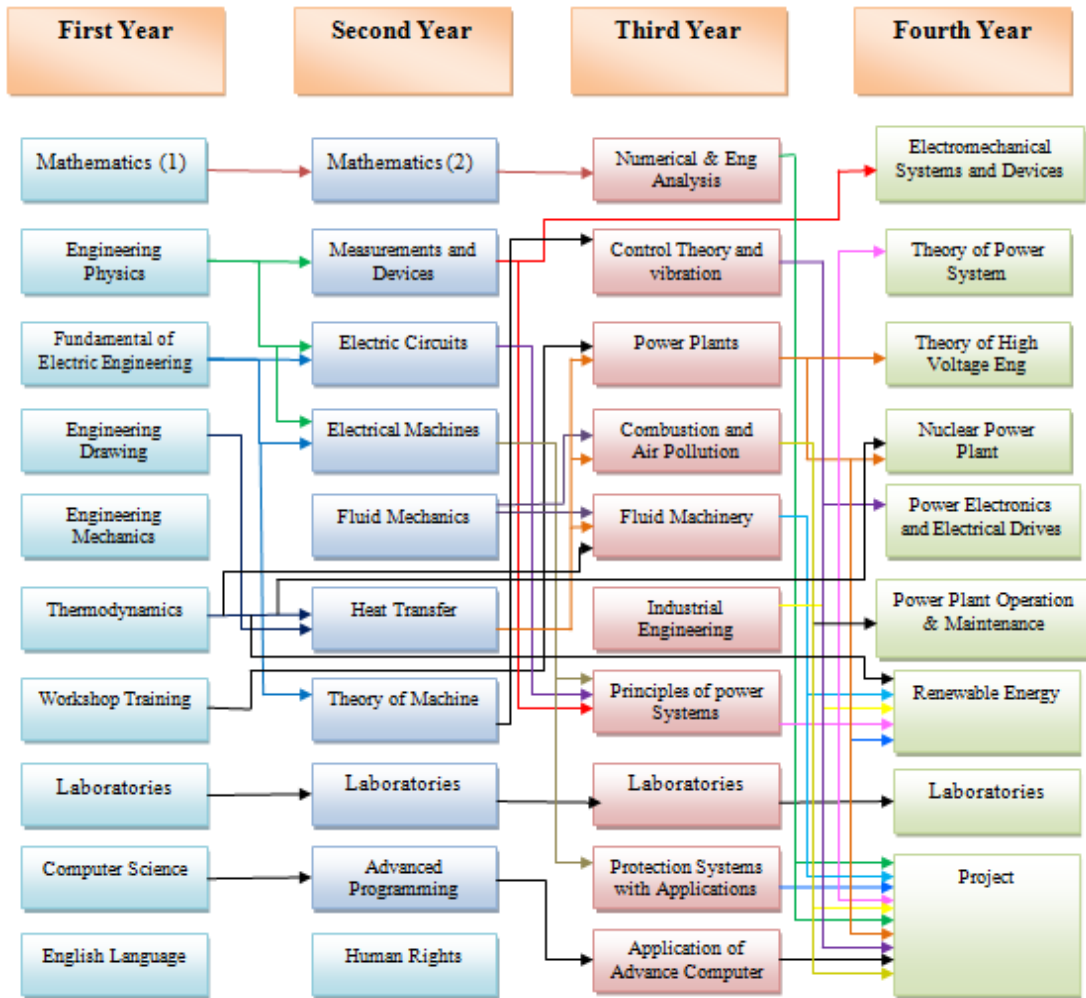
## **B. Course Syllabi**

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 EREE faculty.

**Table 5.1 Curriculum**

Course (Department, Number, Title) List all courses in the program by term starting with first term of first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE. <sup>1</sup>	Subject Area (Credit Hours)				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Maximum Section Enrollment for the Last Two Terms the Course was Offered <sup>2</sup>
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
EMEE 111/ English Language	R			4		2014-2016	110
EMEE 122/ Computer Science	R		5			2014-2016	110
EMEE 123/ Mathematics	R	4				2014-2016	110
MEE 125/ Physics	R	4				2014-2016	110
EMEE 136 /Fundamental of Electric Engineering	R		5			2014-2016	110
EMEE 137/Engineering and machine Drawing	R		2(√)			2014-2016	110
EMEE139/ Engineering Mechanics	R		5(√)			2014-2016	110
EMEE138/Thermodynamics	R		5			2014-2016	110
EMEE124/Workshop Training	R		4			2014-2016	110
EMEE 211/ Human Rights, Freedom and Democracy	R			2		2014-2016	59
EMEE 222/ Advanced Programming	R		5			2014-2016	59
EMEE 223/ Mathematics	R	4				2014-2016	59
EMEE 234/ Measurements and Devices	R		5			2014-2016	59
EMEE 235/ Electric Circuits	R		5			2014-2016	59
EMEE 236/ Electrical Machines	R		5			2014-2016	59
EMEE 237/ Fluid Mechanics	R		5			2014-2016	59
EMEE 238/ Heat Transfer	R		5			2014-2016	59
EMEE 239/ Strength of Materials and Vibration	R		5			2014-2016	59
EMEE 322 / Application of Advance Computer	R		5(√)			2014-2016	61
EMEE 323/ Numerical & Engineering Analysis	R	4				2014-2016	61
EMEE 334/ Control Theory and vibration	R		5			2014-2016	61
EMEE 337/ Power Plants	R		5			2014-2016	61
EMEE335/ Combustion and Air Pollution	R		5			2014-2016	61
EMEE 336 / Fluid Machinery	R		5			2014-2016	61
EMEE321/ Industrial Engineering	R		4			2014-2016	61
EMEE 338 / Principles of power Systems	R		4			2014-2016	61
EMEE 339 / Protection Systems with applications	R		4			2014-2016	61
EMEE 431/ Electromechanical Systems and Devices	R		5			2014-2016	63
EMEE432/ Theory of power system	R		5			2014-2016	63
EMEE433/ Theory of high voltage engineering	R		5			2014-2016	63
EMEE434/ Nuclear Power Plant	R		4			2014-2016	63
EMEE435/ Power Electronics and Electrical Drives	R		5			2014-2016	63
EMEE 436/ Power plant operation and maintenance	R		4			2014-2016	63
EMEE 437/ Renewable Energy	R		4			2014-2016	63
EMEE 438/ Project	R		3(√)			2014-2016	63
Total-Abet Basic-Level Requirements							
Overall Total Credit Hours For Completion Of The Program	155	16	133	6	-		
Percent Of Total		10.32%	85.8%	3.8%			

## Prerequisite Flow Chart for Energy and Renewable Energies Engineering



**Table 5-2 Mapping of Program Educational Objectives to Student Outcomes PEOs Student Outcomes (SOs)**

PEO <sub>s</sub>	Student Outcomes (SO <sub>s</sub> )										
	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 5-3 Contribution of Required Courses to Student Outcomes Required Courses Student Outcomes (SOs)**

Subject code	a	b	c	d	e	f	g	h	i	j	k
EMEE 111									•		
EMEE 122	•	•			•		•				•
EMEE 123	•				•						
EMEE 124				•		•			•		
EMEE 125	•				•						
EMEE 136	•	•			•						•
EMEE 137	•		•		•						
EMEE 138	•	•						•			
EMEE 139	•	•							•		•
EMEE 211						•			•	•	
EMEE 222	•	•									•
EMEE 223	•				•			•			
EMEE 234	•	•									•
EMEE 235	•	•			•						•
EMEE 236	•	•									•
EMEE 237		•	•					•	•		•
EMEE 238		•	•					•	•		•
EMEE 239	•	•			•						•
EMEE 321					•			•	•		
EMEE 322	•	•			•		•			•	•
EMEE 323	•							•			
EMEE 334		•	•				•	•		•	•
EMEE 335		•	•						•		•
EMEE 336	•	•	•		•			•	•		•
EMEE 337		•	•					•	•		•
EMEE 338	•				•	•		•		•	
EMEE 339	•				•	•		•			
EMEE 431	•	•			•			•			•
EMEE 432	•	•				•	•		•	•	•
EMEE 433	•	•			•	•		•	•	•	•
EMEE 434						•					
EMEE 435	•	•			•		•	•	•	•	•
EMEE 436	•		•		•	•			•	•	
EMEE 437			•	•		•	•				
EMEE 438	•			•				•			

**CRITERION 6. FACULTY**

**A. Faculty Size**



The size of faculty is 39 instructors.

## **B. Professional Development**

In faculty vitae

## **C. Authority and Responsibility of Faculty**

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 centres, 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 centres.
- 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.

#### Content2

#### 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 full-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 centres, and academic authorities and centres.

Faculty Name	Highest Degree Earned – Field and Year	Type of Academic Appointment T, TT, NTT	FT or PT	Years of Experience			Professional Registration/ Certification	Level of Activity H, M, or L		
				Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Jalal Mohammed Jalil	Ph.D. in Mech. Eng. (1989)	T	FT	40	31	13	-	H	H	H
Khalil I. Mahmoud	Ph.D. in Mech.Eng. (1979)	T	FT	37	37	37	-	H	H	H
Talib Z. Farge	Ph.D. in Mech. Eng. (1989)	T	FT	38	31	13		H	H	H
MuhammadZ. Khalifa	Ph.D. in Mech. Eng. (2003)	T	FT	36	21	13		H	H	H
KassimKhayry Abbas	Ph.D. in Mech. Eng. (1987)	T	FT	41	34	13		M	M	M
Abdul Latif A. Jadallah	Ph.D. in Mech. Eng. (2001)	T	FT	35	22	13		H	H	H
Kays A. Al-Tae'y	Ph.D. in Mech. Eng. (2006)	T	FT	15	15	15		H	M	M
Ibtisam A. Hassan	Ph.D. in Mech. Eng. (1998)	T	FT	35	29	29		H	M	M
Hussein M. Salih	Ph.D. in Mech. Eng. (2006)	T	FT	28	16	13		H	H	H
Hashim A. Hussein	Ph.D. in Mech. Eng. (2007)	T	FT	30	16	13		H	H	H
AseelJ. Mohammed	Ph.D. in Elect. Eng. (2006)	T	FT	15	15	15		H	M	M
Hatam K.Kadhom	Ph.D. in Mech. Eng. (2007)	T	FT	23	21	21		H	M	M
Sahar R. Al- Sakini	Ph.D. in Elect. Eng. (2003)	T	FT	29	17	29		H	M	M
Majida K. Ahmed	Ph.D. in Elect. Eng. (2007)	T	FT	16	16	16		M	M	L
Ali H.Numan	Ph.D. in Elect. Eng. (2009)	T	FT	14	14	14		H	H	H
Khalid F. sultan	Ph.D. in Mech. Eng. (2012)	T	FT	24	12	13		H	H	H
Ban M. Mohammed	Ph.D. in Mech. Eng. (2013)	T	FT	17	17	17		M	M	L
Walaam. Hashim	Ph.D. in Mech. Eng. (2015)	T	FT	26	11	11		H	H	H
IshamA. Hoshi	Ph.D. in Mech. Eng. (2016)	T	FT	14	6	14		H	M	M
Ali H. Ali Saeed	MSc. Mech.Eng. (1983)	T	FT	39	33	33		H	M	H
Haqil.Igatta	MSc. Mech.Eng. (2003)	T	FT	37	33	13		H	H	H
KaremaA.Hamad	MSc. Mech. Eng. (2003)	T	FT	37	13	13		H	H	H
Adel R. Othman	MSc. Elect. Eng. (2008)	T	FT	24	8	13		H	H	M
Ali D. Salman Ali	MSc. Mech. Eng. (2002)	T	FT	10	10	10		M	M	M
HadiaK. Judran	MSc. Mech. Eng. (2009)	T	FT	16	7	16		M	M	M
ZainabB. Abdulla	MSc. Elect. Eng. (2001)	T	FT	22	15	22		H	M	M
Hussain G. Jabir	MSc. Elect. Eng. (2004)	T	FT	27	12	13		H	H	M
WaleedS. Saleem	MSc. Mech. Eng. (1984)	T	FT	41	33	13		H	H	M
HashmiaS. Dakheel	MSc. Elect.Eng. (2000)	T	FT	22	16	22		H	M	M
LouayA.Rasheed	MSc. Mech. Eng. (2014)	T	FT	7	3	7		H	M	M
AkramH. Abed	MSc. Mech. Eng. (2014)	T	FT	10	3	10		H	H	M
Abdulmunem R. Abdulmunem	MSc. Mech. Eng. (2015)	T	FT	10	2	10		H	H	M
NASSR F. HUSSEIN	MSc. Mech. Eng. (2010)	T	FT	11	6	11		M	M	M
Ibrahim F. Kadhim	MSc. Mech. Eng. (2014)	T	FT	7	3	7		H	M	M

Abdulrahman S. Mahmood	MSc. Mech. Eng. (2015)	T	FT	16	2	11		M	M	M
Isam K.Fadhil	MSc. Elect. Eng. (2015)	T	FT	5	2	5		M	M	M
IsraaS. Ahmed	MSc. Mech. Eng. (2004)	T	FT	11	11	11		M	M	M
SammarJ. Ismail	MSc. Elect. Eng. (2003)	T	FT	11	11	11		H	M	M
Hussain S. Abd	MSc. Mech. Eng. (2010)	T	FT	11	6	11		M	M	M

No	Faculty Member (name)	P T o r F T	Classes Taught (Course No. /Credit Hrs.)	Program Activity Distribution			% of Time Devoted to the Program
				Teaching	Research or Scholarship	Other	
1	Jalal M.Jalil	F T	EMEE 437/ Renewable Energy(4)	50%	40%	10%	100%
2	Khallel I. Mahmoud	F T	EMEE321/ Industrial Engineering(4)	50%	40%	10%	100%
3	Talib Z. Farge	F T	EMEE138/Thermodynamics(5)	50%	40%	10%	100%
4	Muhannad Z.Khalifa	F T	EMEE 239/ strength of material and vibration(5)	50%	40%	10%	100%
5	Kassim K. Abbas	F T	--	50%	40%	10%	100%
6	Abdul LatifA.Jadallah	F T	EMEE139/ Engineering Mechanics(5)	50%	40%	10%	100%
7	Kays A. Al-Tae'y	F T	EMEE 323/ Numerical & Engineering Analysis(4)	50%	40%	10%	100%
8	Ibtisam A. Hassan	F T	EMEE 238/ Heat Transfer(5)	50%	40%	10%	100%
9	Hussein M.Salih	F T	EMEE 336 / Fluid Machinery(5)	50%	40%	10%	100%
10	Hashim A. Hussein	F T	EMEE434/ Nuclear Power Plant(4)	50%	40%	10%	100%
11	Aseel J. Mohammed	F T	EMEE 334/ Control Theory and vibration(5)	50%	40%	10%	100%
12	Hatam K. Aldafai	F T	EMEE 431/ Electromechanical Systems and Devices(5)	50%	40%	10%	100%
13	Sahar R. Al- Sakini	F T	EMEE 338 / Principles of power Systems(4) &EMEE432/ Theory of power system(5)	50%	40%	10%	100%
14	MajidaK.Ahmed	F T	EMEE 431/ Electromechanical Systems and Devices(5)	50%	40%	10%	100%
15	Ali Hussein Numan	F T	EMEE435/ Power Electronics and Electrical Drives(5)	50%	40%	10%	100%
16	Khalid Faisal sultan	F T	EMEE 337/ Power Plants(5)	50%	40%	10%	100%
17	Ban M. Mohammed	F T	EMEE 436/ Power plant operation and maintenance(4)&EMEE 237/ Fluid Mechanics(5)	50%	40%	10%	100%
18	Walaa M. Hashim	F T	EMEE 238/ Heat Transfer(5)	50%	40%	10%	100%
19	Isham A. Hoshi	F T	EMEE 237/ Fluid Mechanics(5)	50%	40%	10%	100%

20	Ali H. Ali Saeed	F T	EMEE 137/Engineering and machine Drawing(2)	50%	40%	10 %	100%
21	Haqi I.gatta	F T	EMEE 223/ Mathematics(4)	50%	40%	10 %	100%
22	KaremaA.Hamad	F T	EMEE 123/ Mathematics(4)	50%	40%	10 %	100%
23	Adel R. Othman	F T	EMEE 436/ Power plant operation and maintenance(4)	50%	40%	10 %	100%
24	Ali Dawood S. Ali	F T	Lab	50%	40%	10 %	100%
25	HadiaK. Judran	F T	Lab	50%	40%	10 %	100%
26	Zainab B. A.Basheer	F T	Lab	50%	40%	10 %	100%
27	Hussain G. Jabir	F T	EMEE433/ Theory of high voltage engineering(5)&EMEE 339 / Protection Systems with applications(4)	50%	40%	10 %	100%
28	WaleedS. Saleem	F T	EMEE 137/Engineering and machine Drawing(2)	50%	40%	10 %	100%
29	HashmiaS. Dakheel	F T	Lab	50%	40%	10 %	100%
30	LouayA.Rasheed	F T	Lab	50%	40%	10 %	100%
31	AkramH. Abed	F T	Lab	50%	40%	10 %	100%
32	Abdulmunem R. Abdulmunem	F T	Lab	50%	40%	10 %	100%
33	NASSR F. HUSSEIN	F T	Lab	50%	40%	10 %	100%
34	Ibrahim F. Kadhim	F T	Lab	50%	40%	10 %	100%
35	AbdulrahmanS.Mahmood	F T	Lab	50%	40%	10 %	100%
36	Isam K.Fadhil	F T	Lab	50%	40%	10 %	100%
37	IsraaS. Ahmed	F T	Lab	50%	40%	10 %	100%
38	Sammar S. Ismail	F T	lab	50%	40%	10 %	100%
39	Hussain S. Abd	F T	lab	50%	40%	10 %	100%

Table 6-2 Faculty Work Load Summary, EREE

Table 6-3 EREE Area Committees

<b>Area Committee</b>	<b>EMEE Faculty Members</b>
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Fluid-Heat	<ol style="list-style-type: none"> <li>1. Prof. Dr. Jalal Mohammed Jalil</li> <li>2. Ass. Prof. Dr.KassimKhayry Abbas</li> <li>3. Ass. Prof. Dr.Ibtisam A. Hassan</li> <li>4. Ass. Prof. Dr. Hussein MajeedSalih</li> <li>5. Ass. Prof. Dr. Abdul Latif Ahmed Jadallah</li> <li>6. Ass. Prof. Dr.Hashim Abed Hussein</li> <li>7. Ass. Prof. Dr.KaysAbedelAlameerAltaey</li> <li>8. Ass. Prof. Haqi Ismael Gatta</li> <li>9. Lec. Dr. Khalid Faisal sultan</li> <li>10. Lec.Dr. Ban M. Mohammed</li> <li>11. Lec.Dr. WalaamousaHashim</li> <li>12. Lec.Dr. HishamAssi Hoshi</li> <li>13. Lec.KaremaAssiHamad</li> </ol>
Applied Mechanics	<ol style="list-style-type: none"> <li>1. Ass. Prof. Dr.MuhannadZaidanKhalifa</li> <li>2. Ass. Prof. Dr.AseelJasim Mohammed</li> <li>3. Ass. Prof. Ali Hussain Ali Saeed</li> <li>4. Ass. Prof. Dr.Hatam K. Kadhom</li> <li>5. Ass.Lec. Ibrahim FalihKadhim</li> <li>6. Lec. Isam Kareem FadhilAss</li> </ol>
Power and Machines	<ol style="list-style-type: none"> <li>1. Dr.Sahar R. Al- SakiniLec</li> <li>2. Dr. Ali Hussein NumanLec</li> <li>3. Lec. Dr.Majida Khalil Ahme</li> <li>4. Lec. Adel Ridha Othman</li> <li>5. Ass.Lec. HussainGhadir Jabir</li> <li>6. Ass.Lec. HashmiaSharadDakheel</li> <li>7. Ass.Lec. Zainab B. Abdulla Basheer</li> </ol>

## **CRITERION 7. FACILITIES**

The facilities available to the faculty and staff of the Energy and Renewable Energy Engineering branch are adequate for the needs of the undergraduate curriculum. The Energy and Renewable Energy Engineering branch is housed in the main building of electromechanical department that was built in 1975. This building is composed of learning classroom, conference room, several laboratories, and faculty/staff office space.

### **A. Energy and Renewable Energy Engineering Staff and Faculty Offices**

The Energy and Renewable Energy Engineering branch office is staffed by a branch chief located on the first floor along with the branch coordinator office. There are also three offices, meeting office, quality assurance and university performance committee office and follow-up student's committee office. The faculty offices are large, well maintained and easily located by both students and visitors. The faculty offices located on the second floor

### **Classrooms**

The Energy and Renewable Energies Engineering branch has a modern and composed (17) Classrooms. This classroom is used by the students as a commons area for studying or working on class projects. Other classrooms are shared with the other academic branches in the EME building and are scheduled on a semester by semester basis as needed. These classrooms are listed in Table 7-1 below.

**Table 7-1: Classrooms used for EREE required courses**

Lecturing rooms (Halls)		Area (m <sup>2</sup> )	Capacity
Room code	Use as		
1	Lecture room	143m <sup>2</sup>	165
2	Lecture room	143m <sup>2</sup>	162
3	Lecture room	143m <sup>2</sup>	147
4	Lecture room	143m <sup>2</sup>	126
5	Lecture room	152m <sup>2</sup>	126
6	Lecture room	141m <sup>2</sup>	126
7	Lecture room	155m <sup>2</sup>	122
8	Lecture room	150m <sup>2</sup>	122
9	Lecture room	47m <sup>2</sup>	35
10	Lecture room	47m <sup>2</sup>	35
11	Lecture room	47m <sup>2</sup>	48
12	Lecture room	47m <sup>2</sup>	38
13	Lecture room	47m <sup>2</sup>	44
14	Lecture room	47m <sup>2</sup>	47
15	Lecture room	47m <sup>2</sup>	33
16	Lecture room	47m <sup>2</sup>	76
17	Lecture room	50m <sup>2</sup>	49
18	Lecture room	50m <sup>2</sup>	49
19	Lecture room	50m <sup>2</sup>	49
DW	Tech.drawing	147m <sup>2</sup>	42
HD	High studies	148m <sup>2</sup>	28
Alkiny hall	Seminars,conferences	283m <sup>2</sup>	234
LIB	library	144m <sup>2</sup>	35
INT	internet	35m <sup>2</sup>	10

### Conference Room

The EMEE conference room (3) is used as a faculty meeting room, an interview room and a classroom with modern data show and screens, which is an area (283 m<sup>2</sup>) and capacity (234) people.

### Laboratories

All Energy and Renewable Energy Engineering laboratories are described in Table 7-2, with room number, size and courses taught for each room along with the condition of the laboratory and its adequacy for instruction.

**Table 7-2: EREE Laboratory Facilities**

<b>Laboratory, Including Courses Taught</b>	<b>Condition of Laboratory</b>	<b>capacity</b>	<b>Area (Sq. m.)</b>
Heat transfer Lab. EMEE2, EMES2	Very Good	18	75
Fluid Lab. EMEE2, EMES2	Very Good	25	175
Computer Lab. (all)	Very Good	30	65
Thermodynamic Lab. EMEE1	Very Good	18	50
Combustion & Emissions Lab. EMEE3	Good	20	140
Fluid machinery Lab. EMEE3	Very Good	20	140
Electrical machines lab. AC-DC EMEE2, EMES2	Very Good	25	260
Power electronics lab. EMEE4, EMES4	Very Good	25	75
Power system Lab. EMEE4	Very Good	20	75
Power plant lab. EMEE3	Good	20	140
Renewable Energy lab. EMEE4	Very Good	20	
High voltage lab. EMEE4	Very Good	20	

## **B. Resources and Support**

### **Computers**

Energy and Renewable Energies Engineering faculty and staff have access to all computing resources, including the availability for desk top and/or lap top computers, printers, and any necessary software. Computers have access to the Internet through high speed wired connections. All campus buildings have both wired and wireless network connectivity. Computer service requests are processed through the campus Information Technology Department. The most commonly used computer lab by Energy and Renewable Energies Engineering majors is room ( ) in the main Building. This computer laboratory composed is (33) workstations, projectors, and standard campus software on all machines. All residence halls are wired for internet and network access. The software that is used within the curriculum includes Microsoft Office applications, MATLAB /Simulink, AutoCAD, Automation studio. All of the computer hardware and software systems more than adequately support the Energy and Renewable Energy Engineering program educational objectives and outcomes.

### **C. Guidance**

Branch interested in determining graduation projects for students, which is a solution to the problems of industrial and dilemmas in the work field and to provide appropriate solutions that are derived from the jurisdiction of the branch. The branch has laid the foundations for deepening the relationship between students and field work in the industrial and productive institutions by sending groups of students for summer training in these institutions to serve and strengthen that relationship.

### **D. Maintenance and Upgrading of Facilities**

Describe the policies and procedures for maintaining and upgrading the tools, equipment, computing resources, and laboratories used by students and faculty in the program.

### **E. Library Services**

The branch contains in addition to the Central University Library to its own library of 144 square meters and with a capacity of 35 students, and the table below represents assets that serve the student and teaching in their respective fields.

Desktop business computers.	2
Computing used for sources and references databases	5
Computer disks where scientific research.	252
Scientific movies.	20
Number of book titles.	2173
Number of patrols addresses.	23

## **CRITERION 8. INSTITUTIONAL SUPPORT**

The Energy and Renewable Energies Engineering has sufficient Institutional Support and Financial Resources to assure the quality and sustainability of the program in support of the *Program Educational Objectives* and *Student Outcomes*. The decentralized budget affords the branch the opportunity to make prudent decisions and allocate their available resources appropriately. The financial resources are sufficient to attract on an ongoing basis qualified faculty. The resources also insure the department's ability to acquire, maintain and operate the facility and associated equipment.

#### **A. Leadership**

The Energy and Renewable Energy Engineering Branch is led by an experienced administrative leadership. Dr. Talib Z. Farge, assistant Professor, He has a Ph.D. in Mechanical Engineering (Turbo-machinery), from the University of Liverpool, United Kingdom, in 1989. In 11/9/2014, he has been named the Chairman of the Energy and Renewable Energy Engineering Branch. In addition to leading the branch, some of his time has been devoted to develop new strategic plans that emphasize continuous careful review of the undergraduate curriculum and develop changes that are consistent with modern trends in engineering education.

Department administration/leadership is composed of three major components: Department Dean, Dean Assistances (2) and Chairs of the Branches (3). To ensure seamless integrations for all courses in the Branches, the Area Committee Chairs are the automatic members of the Branch Council. For curricular issues pertinent to a specific program Area, the Area Committee Chair brings those issues back to his Area Committee for discussions and recommending solutions. The recommended solutions are brought back to the Branch council where balanced views from other Areas Committees are developed and discussed before recommending to the general faculty for further discussion and adoption. ABET preparation; assessment in particular, is a major task given to the ABET coordinator. The ABET coordinator is in charge of coordinating the ABET material preparation, assessment, and holding the time lines throughout the entire period of program accreditation. The ABET Report has a stationary spot in the EREE Faculty Meeting. It outlines and prepares for the annual activities for ABET, particularly the assessments for both Student Outcomes and Program Educational Objectives. By working with the Chair, the ABET coordinator makes annual presentation to both the EREE faculty and the EREE Industrial Advisory Council. The Chair leads the discussion, identifies problems, and develops possible solutions with the faculty based on the assessment results.

The Manager of the administration is responsible for Space & Equipment, space distribution/redistribution upon the request from the faculty and is appointed by the Department Dean. Labs Manager is responsible for labs equipment's, undergraduate lab improvement, and Computer Enhancement Program and is appointed by the Department Dean.

The university have a career counseling office as requested to advice the student about the future job. The Energy and Renewable Energies Engineering Branch supports the staff in any training they feel will help with the jobs they are asked to perform. All staff members are encouraged to attend the training programs that provided on campus. There are also countless numbers of workshops and trainings

available to the staff to attend during the year to help them achieve goals at work. There is even funding that staff can apply for training outside of the University. The department also encourages the staff to further enhance their academics by supporting the staff to attend college. The University provides financial support to attend the conferences outside Iraq. The Ministry and the University also have awards that are given every year based on Staff performance. Each year staff members are nominated for distinguished award and chosen to receive the award in Science Day in April. The staff members are offered salary increases annually based on governmental rules of salary.

## **B. Program Budget and Financial Support**

The operating budget of EREE is satisfactory to meet the department's goals, objectives, and projected outcomes. The decentralized budgeting process allows the department to plan and execute, as it deems appropriate. The ability to manage the department's financial resources on a continuous basis and re-deploy available resources as the needs change insures flexibility and an immediate response to departmental needs.

The Department manages and monitors its own budget, which includes all the operating expenses of the Department and capital equipment for continuous improvement of undergraduate laboratories. The budget is allocated through Ministry of Higher Education and Scientific Research. The University distributed the budget in the various categories after Ministry permission. The categories include; maintenance and repair, functional operations of undergraduate laboratories, over load teaching, educational support, and staff salaries. Capital equipment fund for continuous improvement of undergraduate laboratories is allocated separately by the Ministry, for last five years, **one million dollar** was spent on undergraduate Labs to buy a new devices.

## **C. Staffing**

The department organized different courses through the center of continuing education in several areas, including the use and applications of computer systems, maintenance and how to use them in administrative work.

Educational Technology Courses were organized in continuing education center to teach the new staff how to teach, these courses were organized periodically for new member of staff.

Every teacher must enter a course in teaching methods, especially if he is one of the new graduates as well as a course in Computer and thereafter subjected to practice teaching under the supervision of two known faculty staff and for a period of three months and are tested suitability for teaching during this period. He is then evaluated and interviewed by the supervised professors and under the form prepared in advance and then the teacher is called to a meeting of the Scientific Committee in the department in order to present a subject chosen by him and be asked in order to know the level of his scientific, ability and strength of character to answer questions. The teacher is rated by the Scientific Committee using special form prepared by the board of the department. If the teacher is eligible from the viewpoint of the department to enter the educational process, his papers is sent to be treated in the Scientific

Committee of the university and assessed there under a form especially prepared by this Committee, in order to be deciding on the validity or non-validity of the teaching.

**D. Faculty Hiring and Retention**

The member of staff in the branch is sufficient for teaching.

**E. Support of Faculty Professional Development**

The university professional development efforts represent a prime objective of the university, which are manifested in the following two areas:

1. Academic Development, which is administered by the Ministry (R & D Office in the MOHESR),
2. University Research Development, which is administered also by the Ministry (R & D Office in the MOHESR), University Funding allocated is adequate for the needs of both lines. Accordingly, both planned activities and allocated funding are adequate for the university professional development.

**PROGRAM CRITERIA**



## 1. Curriculum

Criteria for Electromechanical System Engineering Program:

Our program satisfy Mechanical and Electrical Engineering programs requirements. For Mechanical Engineering part, our curriculum satisfy ABET Mechanical Engineering criteria:

The curriculum must require students to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations); to model, analyze, design, and realize physical systems, components or processes; and prepare students to work professionally in both thermal and mechanical systems areas.

For Electrical Engineering part, our curriculum satisfy ABET Electrical Engineering criteria:

The curriculum must include applications appropriate to the program name; mathematics through differential and integral calculus; sciences (defined as physical science); and engineering topics (including computing science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

## 2. Faculty

The program must demonstrate that faculty members responsible for the upper- level professional program are maintaining currency in their specialty area. The curricular requirements of the Mechanical and Electrical Engineering Program Criteria are satisfied by attainment of Student Outcomes 'a', 'c' and 'e'. First, the component of "mathematics (including multivariate calculus and differential equations)" was included in our Student Outcome 'a' as described in the section "CRITERION 3 STUDENT OUTCOMES". Therefore, the first part of the curricular requirements is satisfied by attainment of the Student Outcome 'a' and the second part, by the Student Outcomes 'c' & 'e'. The assessment and evaluation of the Student Outcomes 'a', 'c' and 'e' are described in the section "CRITERION 4 CONTINUOUS IMPROVEMENT".

### **Student Outcomes:**

- a. an ability to apply knowledge of engineering, science, and mathematics (including multivariate calculus and differential equations).
- c. an ability to design systems, components, or processes to meet desired needs within realistic constraints.
- e. an ability to identify, formulate, and solve energy and renewable energies engineering problems;

The faculty requirements of the Mechanical and Electrical Engineering Program Criteria are satisfied by the qualifications of our faculty members, which are described in the section "CRITERION 6.