Information and communication Engineering Department

Information & Communication Engineering Department: A Brief

The department of Information and Communications engineering was established in the beginning of the academic year 1997-1998 and joined to Al- Khwarizmi College of engineering in the academic year 2002-2003. The study period is four years, during which the students study various topics in information and communication engineering. These topics cover a variety of subjects in communication and information engineering, such as the software and hardware of computer networks and how they can be linked together through the communication systems that used a plain or secure channels. After completing the courses successfully, the students will be awarded a bachelor's degree in information and communication engineering.

Vision

Our vision is to graduate students that able to efficiently tackle problems in their field by providing them with up to date theoretical and practical approaches related to the information and communication engineering.

Mission

The aim of the department is devoted to teach information and communication engineering through:

1. Developing and providing students with modern techniques.
2. Creating a new generation of engineers that professionally able to update the IT and communications infrastructures.
3. Providing services to the community by solving issues that facing the industry sectors.

Goals:

Developing and improving the teaching and the research potential of the faculty members in order to be able to graduate an engineer that able to meet the local and global industrial demands.

Criterion 1- Students

Undergraduate Students

Student Admissions

An applicant for admission to the undergraduate program of information & communication engineering department, Al-Khwarizmi college of engineering, Baghdad University, must satisfy the following minimum requirements:
The applicant should have an Iraqi secondary school certificate, or its equivalent, and majored in natural or technological sciences. The students must obtain a high rate qualifies for admission to engineering colleges.

Acceptance is centrally controlled by the Ministry of Higher Education and Scientific Research.

Distribution of students to the 5 engineering departments of the Al-Khwarizmi college of engineering, including the department of Information & Communication Engineering, is made according to the capacity plan of the departments and the rating average of the applicants and their will. The capacity plan of the department of Information & Communication Engineering in the last three years was 40 students. The number of students accepted is limited to the number of seats available as decided by the College Council based on the capacity of resources at the college.

Enrolment

Since 2007-2008, Information & Communication Engineering Program enrolment has ranged from 25 to 80 students. Table (1) shows the standardized test score and high school rank data for incoming students at Information & Communication Engineering Department for the last ten years.

Table (1): History of admissions standards in the last few years.

Academic Year	Percentile Ranking High School (min)	Percentile Ranking High School (average)	Plan to accept students	Number of New students Enrolled	Number of Transfer Students Enrolled	Number of Graduated Students
2017-2018	94.92	97.12	80	100	20	25
2016-2017	94.85	95.41	80	70	10	25
2015-2016	94.85	93.44	80	67	13	24
2014-2015	93.9	92.91	40	29	11	16
2013-2014	92.57	93.24	40	37	6	18
2012-2013	91.42	91.92	40	29	4	20
2011-2012	90.85	91.49	25	23	2	22
2010-2011	88.57	90.42	25	21	5	14
2009-2010	87.28	88.28	25	24	1	1
2008-2009	87.71	93.42	25	23	6	20
2007-2008	92	96.14	25	22	-	27

An applicant who has graduated from a secondary school outside Iraq must have completed twelve years of combined primary and secondary school studies from a recognized school. He or she is also required to provide an equivalency certificate from the Iraqi Ministry of Education.

Evaluating Student Performance

Overview

Student performance in each course is evaluated by the faculty members, culminating with the assignment of a grade for that course. The number and types of graded assignments vary according to what is most appropriate for the course in question. These assignments are generally a combination of examinations, quizzes, homework's, and/or laboratory reports. Projects and/or oral presentations are required for some courses. Certain assignments are graded by a group of the faculty or instructors. The student also gives an oral presentation of his project work, and answer questions on it.

Educational Program
Credit Hour Definition

The Information & Communication Engineering Department follows the university wide standard definition of units. Information & Communication engineering program has the annual system of study, which is followed for all subjects, that is; the number of hours, which is assigned for each subject, is the same for both the first semester and the second semester. Excluding the final examination week, one semester unit represents one class hour per week with a stipulated duration of 50 minutes. Based on the definition of a 30-week per year, a typical three-unit class consists of 90 hours of contact hours. In academic year (2016-2017) the courses system of study is followed for the first stage. Each course has a 15-weeks for each subject.

Participant and Graduation Trends

Table (2): Number of the participant students and rate of success for the last few academic years.

Class		1st	2nd	3rd	4th	5th	Total
2007-2008	No. of students	23			19	27	69
	Success Rate %	70			100	100	
2008-2009	No. of students	29	15			20	64
	Success Rate %	56	87			100	
2009-2010	No. of students	27	24	14		1	75
	Success Rate %	76	75	86		100	
2010-2011	No. of students	22	24	23	14		83
	Success Rate %	73	71	87	100		
2011-2012	No. of students	20	20	23	22		85
	Success Rate %	45	50	69	100		

2012-2013	No. of students	44	20	19	20		103
	Success Rate %	58	70	68	100		
2013-2014	No. of students	42	43	16	18		119
	Success Rate %	33	42	77	90		
2014-2015	No. of students	29	39	29	16		113
	Success Rate %	48	44	47	95		
2015-2016	No. of students	67	30	35	24		156
	Success Rate %	48	55	60	100		
2016-2017	No. of students	55	40	30	30		155
	Success Rate %	59	67	90	97		
2017 - 2018	No. of students	70	46	28	27		171
	Success Rate %	52	72	92	85		

Monitor the Progress of Students

A student's progress is monitored by faculty advisors and the Registrar's Office, they turn in final grades at the end of the academic year to the Registrar's Office, and each student's transcript is checked to ensure that he or she remains in good academic standing. Students who do not maintain an adequate progress in first semester to remain in good academic standing are placed on probation for the second semester. If the student in the second semester again below the minimum for that probationary semester, and the cumulative is below 50%, the student is suspended. Grades are also forwarded to advisors in order to assist them in monitoring student progress.

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

Instructors should follow up the student's attendance correctly and recording the absences on a regular basis in every lecture and delivery of these absences at the end of the week to absence committee, and then issue a preliminary and final warnings for those who are over the rate of 15%. Table (3) shows the percentage of the students' attendance for six academic years for undergraduates study in Information & Communication Engineering Department.

Table (3): Percentage of the student's attendance for eleven academic years for Undergraduates study in Information & Communication Engineering Department.

Class		1st	2nd	3rd	4th	5th	Total
2007-2008	No. of students	23			19	27	69
	Attendance %	94			100	90	
2008-2009	No. of students	29	15			20	64

	Attendance %	90	96			95	
2009-2010	No. of students	27	23	15		1	75
	Attendance %	90	92	96		100	
2010-2011	No. of students	22	24	23	14		83
	Attendance %	92	90	94	100		
2011-2012	No. of students	20	20	23	22		85
	Attendance %	87	90	85	94		
2012-2013	No. of students	44	20	19	20		103
	Attendance %	89	91	95	98		
2013-2014	No. of students	42	43	16	18		119
	Attendance %	95	92	95	100		
2014-2015	No. of students	29	39	29	16		113
	Attendance %	95	96	90	100		
2015-2016	No. of students	67	30	35	24		156
	Attendance	98	90	85	100		
2016-2017	No. of students	55	42	29	30		156
	Attendance %	86	91	90	100		
2017-2018	No. of students	42	14	15	27		98
	Attendance %	23	7	64	38		

Advising of Students

Full-time faculty members in the Department of Information & Communication Engineering advise students. All new students are assigned to the program's undergraduate coordinator upon entering the program.

During the middle of the first semester, they are assigned to various faculty members within the program. The assignment is random and based on balancing the workload among faculty members.

Thus, a new student coming to the department will be assigned to the faculty member with the smallest number of advises. This monitoring is continued throughout the student's academic program to provide continuity and consistent advising for the student. Table (4) shows ratio of the faculty members and their qualifications to the number of students during the last eight academic years. Also table (5) shows ratio of the faculty members according to their scientific rank to the number of students.

Table (4): Ratio of the faculty members and their qualifications to the number of students.

Academic Year	Number of Students	Number of students per 1 Faculty member (Ph.D.)	Number of students per1 Faculty member (M.Sc.)
2017-2018	171	17:1	14:1
2016-2017	156	17:1	9:1
2015-2016	156	19:1	8:1

2014-2015	113	18:1	5:1
2013-2014	119	23:1	6:1
2012-2013	103	20:1	6:1
2011-2012	85	17:1	5:1
2010-2011	83	10:1	6:1
2009-2010	75	9:1	5:1
2008-2009	64	11:1	4:1
2007-2008	69	11:1	6:1

Table (5): Ratio of faculty members according to their scientific rank to the number of students.

Academic Year	Number of Students	Number of students per professor	Number of students per assistant professor	Number of students per lecturer	Number of Students per assistant lecturer
2017-2018	171	-	43:1	24:1	16:1
2016-2017	156		52:1	26:1	9:1
2015-2016	156	-	39:1	26:1	10:1
2014-2015	113	-	28:1	18:1	7:1
2013-2014	119	-	56:1	19:1	7:1
2012-2013	103	-	52:1	17:1	7:1
2011-2012	85	-	42:1	14:1	6:1
2010-2011	83	-	41:1	14:1	6:1
2009-2010	75	-	37:1	12:1	5:1
2008-2009	64	-	32:1	16:1	4:1
2007-2008	69	-	34:1	17:1	6:1

Opinion of Students

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

The Department of Information & Communication Engineering determined that a standardized advising process needed to be developed and posted to make students aware of the correct procedures for being advised. The faculty meets and discusses one-on-one with the student about the long-term strategy of his/her curriculum. Table (6) shows the Students Opinion Questionnaire about faculty member and about Curriculum. Figures (1) - (4) show their results.

Table(6) Students Opinion Questionnaire about faculty member and about Curriculum.

	Questions
A1	The variety of methods to be depended in evaluating the scientific level of the students
A2	The ability of management classroom and enhancement the interactive side at the level of scientific material with students
A3	The ability of development a comprehensive examination questions and measure a variety of scientific level of the students
A4	The interaction with students and instillation the values and norms of the university during the counseling and guidance.

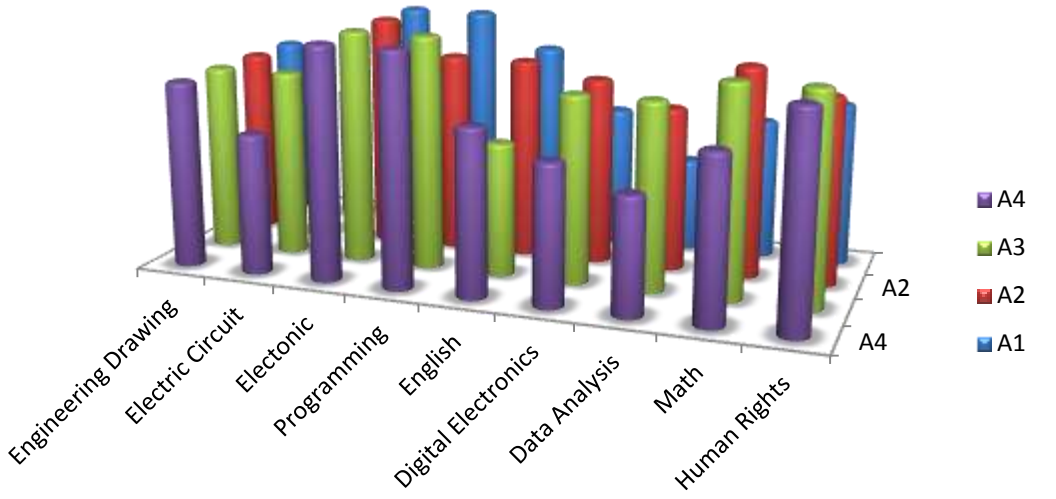


Fig.1 Students Opinion Questionnaire about faculty member and courses for 1st year.

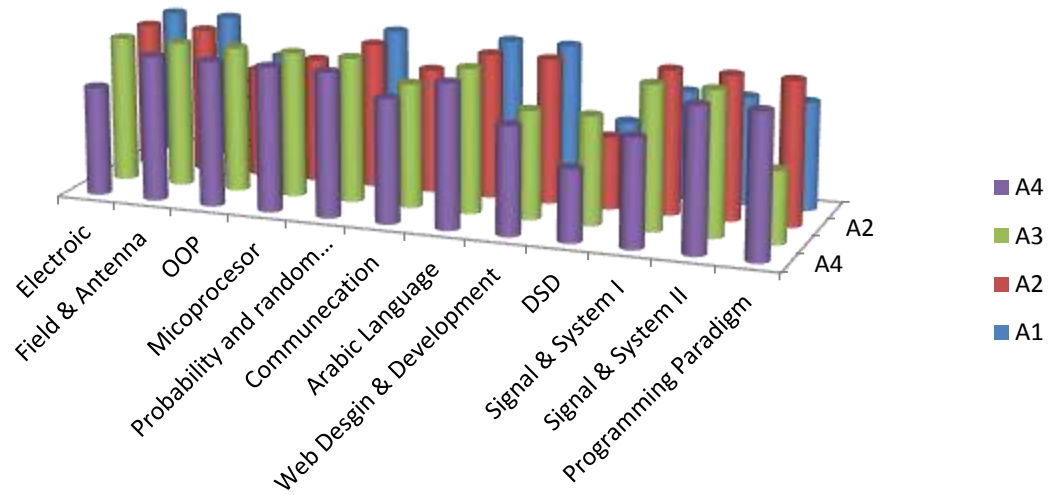


Fig.2 Students Opinion Questionnaire about faculty member and courses for 2nd year.

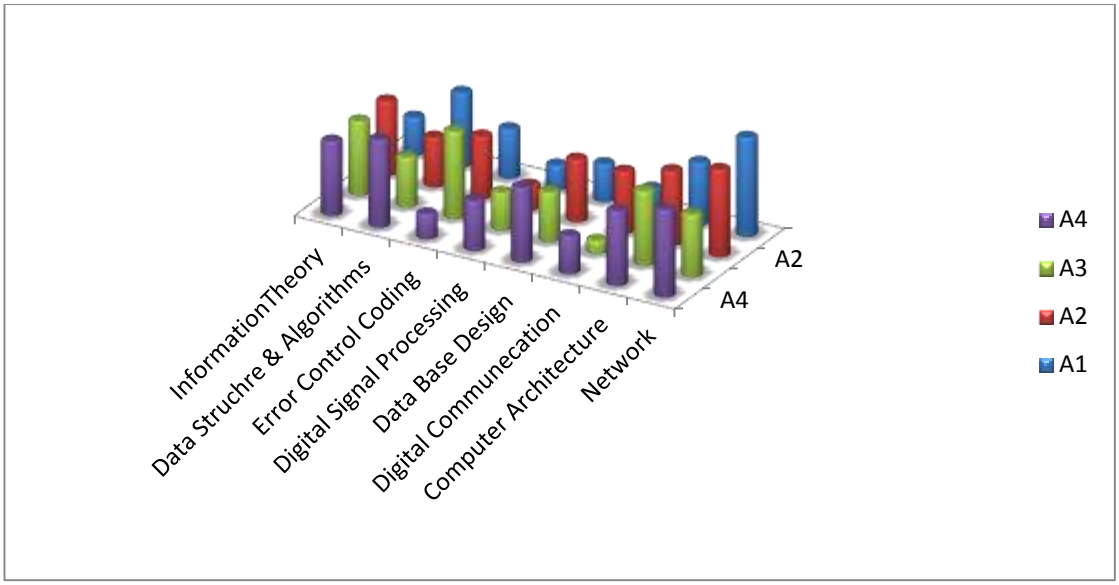


Fig.3 Students Opinion Questionnaire about faculty member and courses for 3rd year.

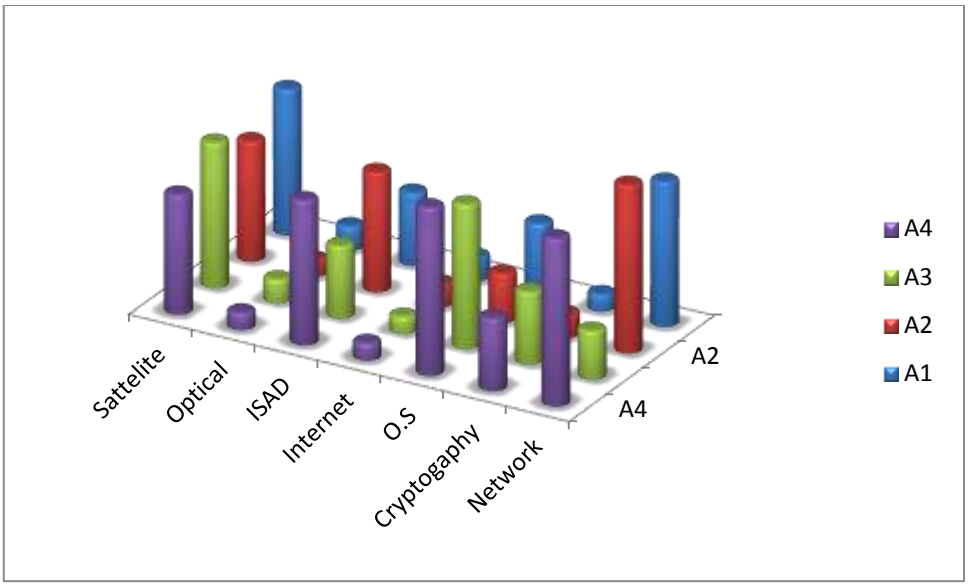


Fig.4 Students Opinion Questionnaire about faculty member and courses for 4th year.

SWOT Analysis Method

The SWOT analysis is an extremely useful tool for understanding and decision-making for all sorts of situations in facilities in each section. SWOT is an acronym for Strengths, Weaknesses, Opportunities, and Threats. The SWOT analysis headings provide a good framework for reviewing strategy, position and direction of the Information & Communication engineering program or any other idea.

	Helpful To achieve the objective	**Harmful** To achieve the objective
Internal Environment	**Strengths** **S**	**Weaknesses** **W**
External Environment	**Opportunities** **O**	**Threats** **T**

SWOT Analysis

SWOT Analysis Matrix

In educational situations the structure of SWOT analysis can be consist of a 2×2 matrix grid. Two pairs of dimensions can produce this matrix. Strengths and weaknesses are mapped or graphed against opportunities and Threats. Strengths and weaknesses are regarded distinctly as internal factors, whereas opportunities and threats are regarded distinctly as external factors. The SWOT analysis in this format acts as a quick decision-making tool, quite aside from the more detailed data that would typically be fed into strategic planning process for each of the SWOT factors.

Subject of SWOT analysis (General subjects identifying).

		Internal Factors	
		Strengths	**Weaknesses**
External Factors	**Opportunities**	***Strengths/Opportunities***	***Weaknesses/Opportunities***
		• Excellent regional reputation • Excellent value for the funding • Student-centered faculty • Outstanding faculty • Quality of research • Good staff • Excellent students • Excellent placement for our graduates • Quality of graduates • Collegial environment • Personalized attention to students by faculty and staff	• Too few faculties/staffs • Weak in development • Lack of contact and weak alumni relations • Lack of quality and quantity of lab space (not enough good quality) • Low salaries/insufficient program funding • No plan for supporting growth; in need of better facility capacity planning • Poor communication (external and internal) • Curriculum too restrictive; too rigid • Aging faculty • Lack of diversity in both faculty and students
	Threats	***Strengths/Threats***	***Weaknesses/Threats***
		• Redefine the college's image • Networking with industry (specific research opportunities for funding) • Advisory board • Expand research into new areas • Research into sustainability/the environment • Ability to reach folks through outreach • Networking with other institutions • Interdisciplinary teaching • Developing our relationships with alumni	• Lack of research faculty and resources • Lack of understanding and support by State Board • Loss of faculty • Not attractive to new faculty • Increased enrollment without increased funding • Too many engineering institutions close by • Conflict among staff, faculty and administration

SWOT Analysis

1- Strengths:

• Admitted students in the lists of the central admissions have good scientific level because the competition among them is based on the total scores obtained by the student at the examinations of the secondary school stage.
• Proactive student support.

2- Weakness:

• Student preparedness at entrance.
• The College suffers from some students who have low level of education because of the laws of return terminated students and complementary examinations.
• The centralized education system in Iraq depends on the instructions and orders issued by the higher authorities in terms of acceptance, transport controls, etc. And the orders and instructions cannot be exceeded.

3- Opportunities:

• Diversity of region (students –industry)
• Supporting outstanding students to perform summer training in special work sites in foreign countries.
• Employing of the first three graduated students to be an incentive for competition among them.

4- Threats:

• The graduate students suffer of frustration because of the working difficulties in departments or companies that can develop their theoretical study in the field of work due to nepotism in appointments of state institutions.

Criterion 2-Program Educational Objectives

Department of Information Engineering and Communications was established at the beginning of the academic year 1997-1998 and joined to Al- Khwarizmi college of engineering in academic year 2002-2003. The study period is four years, during which the students study various topics in information and communication engineering, who are granted the bachelor's degree. This specialization is linked with infrastructure of information technology, namely, it pertains to the hardware and software entity for computers and their networks and various communication systems that links them (for example the Internet), moreover it is also employed for analysis and design of

information systems that use this infrastructure, such as electronic trade, e-learning , e-government and others.

Vision and Mission Statement

Vision

Our vision is to graduate students supported by the quality and adequacy distinct in their field through keeping up the latest technologies in the scientific and practical in the field of information and communication technology.

Mission

The aim of the department is devoted to study information and communication engineering to the great importance in many different fields, including economic, security, industrial, educational through:

- Development a new knowledge and providing students with modern techniques.
- Create a new generation of engineers that professionally able to update the infrastructure in the field of IT and communications.
- Provide services to the community by solving the problems of scientific and technical issues that facing the labor market.

Educational Objectives

Our Department belief in the following values:

1. The Academic Staff Excellence.
2. Keep up with global developments in the area of general specific specialization.
3. To communicate with the community to providing the required services.
4. Direct education to serve the development of society.
5. To maintain the ethics of the teaching profession.

Program's Student Outcomes

During the course of study in Information & Communication engineering, the student should:

- Demonstrate a strong foundation in and the ability to apply fundamental Knowledge of mathematics, science and engineering.
- Demonstrate an ability to design and conduct experiments and to analyze and interpret experimental data.
- Demonstrate an ability to design Information & Communication engineering systems within realistic constraints.
- Contribute to and effectively function in team undertakings, in leadership as well as non-leadership positions.
- Demonstrate an ability to analyze and solve Information & Communication engineering problems.
- Demonstrate an appreciation for professional ethics and for personal integrity and responsibility.
- Demonstrate proficiency in oral and written communications.
- Demonstrate the independent study skills required for lifelong learning.
- Demonstrate an appreciation for contemporary societal issues.
- Demonstrate proficiency in the use of techniques and tools relevant to Information & Communication engineering practice.

Consistence of the Program Educational Objectives with the Mission of the Institution

- The Information & Communication Engineering Department Program Educational Objectives are closely linked to, and consistent with, the University of Baghdad and Al-Khwarizmi college of engineering missions. The University and College missions are directly served by the fourth, fifth and sixth Information & Communication Engineering Department Program Educational Objectives.

Criterion 3- Program Outcomes

Program Outcomes

The current program outcomes are listed below. A graduate who has successfully gained all of the skills, knowledge, and behaviors present in the following outcomes to achieve the program's objectives.

Each Industrial and Systems Engineering student will have demonstrated the following:

a) An ability to apply knowledge of mathematics, science and engineering.
b) An ability to design and conduct experiments, as well as to analyze and interpret data.
c) An ability to design a system, component, or process to meet sustainable Constrains.
d) An ability to function on multi-disciplinary teams to analyze and solve problems.
e) An ability to identify, formulates, and solves problems.
f) An understanding of the Information & Communication Engineering impacts in professional and ethical manner.
g) An ability to communicate effectively in different ways.
h) The broad education necessary to understand the impact of engineering solutions on community and surrounding environment.
i) The understanding of the up-to-date engineering tools and knowledge is the base of learning in the Department.
j) Knowledge of contemporary issues, which is the most important part in the study of Information & Communication Engineering because the scientific and technical problems is a big thread to the work market.
k) An ability to use the techniques, skills, and modern engineering tools necessary for practice of Information & Communication Engineering.

Relationship of Program Outcomes to Program Educational Objectives

The tight correlation between program outcomes and program educational objectives is illustrated in Table (7). By meeting the program's outcomes students gain the tools necessary to join the professional world. These skills in turn allow graduates to achieve the program's educational objectives by succeeding after graduation and reaching their long-term goals.

Table (7): The correlation between program outcomes and program objectives.

Program Outcomes	Program Objectives		
	1	2	3
A	x		
B	x		x
C	x		
D	x		
E		x	
F		x	x
G		x	
H			x
I	x		x
J			x
K	x	x	x

It is clear from the above that the goals of the academic program of the Information & Communication Engineering Department is based on the ensuring a planned and outputs described in the above to do with the ongoing review and evaluation of the educational process and documented. Figures (5) represents the number of B.Sc. graduates for academic years from 2007 to 2018.

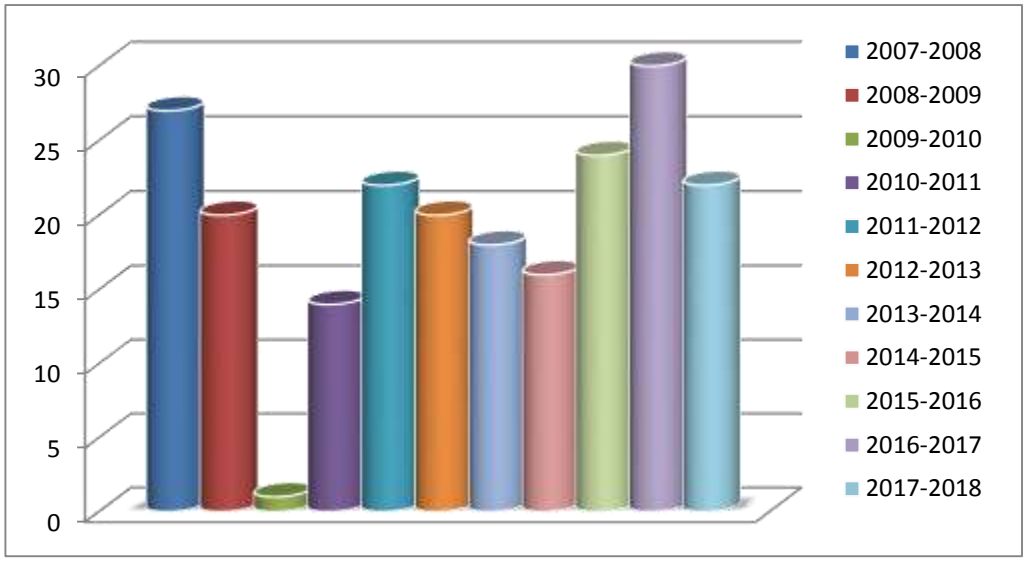


Fig.5: Number of graduated (B.Sc.) students for academic years 2007-2008 to 2017-2018.

SWOT Analysis

1- Strengths:

- Positive reputation in the external community.
- Consistency the program educational objective with the missions of college and university.

2- Weakness:

- The lack of an internal audit system of plans for continuous improvement purposes.
- Communications abilities are not enough to fulfill department objective.

3- Opportunities:

- Preparation of researches that would contribute to solve community problems.

4- Threats:

- Absence of doing consulting engineering work for the various sectors of the states.

Criterion 4-Curriculum

Information & Communication Engineering Program Overview and Data Analysis:

Information & Communication Engineering Program Curriculum Review

This section presents and demonstrates the review of the current Information & Communication Engineering program curriculum for Information & Communication Engineering Department. Table (8) represents the curriculum for undergraduate studies in the department.

Table (8): Curriculum for the undergraduate study in Information & Communication Engineering Program.

Year	Subject	Category (units)		
		Math & Basic Sciences	Engineering Topics	General Education
First Year First Semester	Mathematics I	2		
	Engineering Drawing		2	
	Physics of Electronic		3	
	Electric Circuit Theory		2	
	Electric Circuit Lab		2	
	Computer Programming	2		
	Computer Programming	2		
	Human Rights			1
	Academic English I			1
First Year Second Semester	Mathematics II	2		
	Structured Programming	2		
	Structured Programming	2		
	Electronic Devices & Circuit		2	

	Electronic Devices & Circuit Lab		**1**	
	Digital Electronics		**2**	
	Digital Electronics Lab		**1**	
	Data Analysis and Visualization (MATLAB)	**2**		
	Democracy			**1**
	Academic English II			**1**
Second Year First semester	Signal & Systems I		**3**	
	Probability and Random Processes		**3**	
	Electromagnetic Fields & Propagation		**2**	
	Electronic Systems	**2**		
	Electronic Systems Lab	**1**		
	Object Oriented Programming		**2**	
	OOP Lab		**1**	
	Microprocessor	**2**		
	Microprocessor Lab	**1**		
	Arabic Language			**1**
Second Year Second Semester	Signal &Systems II		**3**	
	Analogue Communication		**2**	
	Analogue Communication Lab		**1**	
	Antenna Theory		**2**	
	Web Design & Development	**2**		
	Web Design Lab	**2**		
	Programming Paradigms		**2**	
	Programming Paradigms Lab		**2**	
	Digital System Design		**2**	

	DSD Lab		**1**	
Third Year First semester	**Digital Signal Processing**		**3**	
	DSP Lab		**2**	
	Digital Communication		**3**	
	Information Theory		**3**	
	Networks		**3**	
	Networks Lab		**2**	
	Data Structure		**3**	
	DS Lab		**2**	
	Computer Architecture		**3**	
Third Year Second semester	**Technical Assignment(mini Project)**		**3**	
	Digital Communication System		**3**	
	Digital Communication Lab		**1**	
	Error Control Coding		**3**	
	Network Protocols		**3**	
	Network Protocols Lab		**2**	
	Computer Algorithms		**3**	
	Computer Algorithms Lab		**1**	
	Data-Base Design		**2**	
	Data-Base Design Lab		**2**	
Fourth Year	Information system analysis & design		**6**	
	Satellite Communications		**4**	
	Computer Networks		**6**	
	Operating systems	**6**		
	Internet Architecture		**4**	
	Cryptography & Data security		**4**	
	Optical communications		**4**	
	Communication Lab		**2**	
	Engineering Project		**4**	

Totals-ABET basic-level Requirements		**30**	**117**	**5**
OVERALL TOTAL FOR DEGREE	**153**			
PERCENT OF TOTAL		**20 %**	**76 %**	**4 %**

3rd and 4th for Multimedia Branch				
Year	**Subject**	**Category (units)**		
		Math & Basic Sciences	**Engineering Topics**	**General Education**
Third Year	Digital Signal Processing		**4**	
	Digital Communications		**6**	
	Image Processing		**6**	
	Information & Coding Theory		**4**	
	Multimedia production		**4**	
	Computer Graphics and Animation		**6**	
	Computer Architecture		**4**	
	Computer Network		**4**	
Fourth Year	**Database & software**	**6**		
	Satellite Communications		**4**	

	Multimedia System		**6**	
	Audio –Video Processing		**6**	
	Internet Architecture		**4**	
	Elective subject		**6**	
	Communication Lab		**2**	
	Engineering Project		**4**	
Totals-ABET basic-level Requirements		**31**	**117**	**6**
OVERALL TOTAL FOR DEGREE	**154**			
PERCENT OF TOTAL		**25 %**	**71 %**	**4 %**

Program Curriculum

1. Describe how students are prepared for a professional career and further study in the discipline through the curriculum and indicate how the curriculum is consistent with the Program Educational Objectives and Program Outcomes.
2. Faculty must ensure that the program curriculum devotes adequate attention and time to each component, consistent with the outcomes and objectives of the program and institution.
3. The professional component must include:

   a) A combination of college level mathematics and basic sciences (some with experimental experience) are appropriate to the discipline.

   b) Engineering topics consisting of engineering sciences and engineering design appropriate to the student's field of study.

- Engineering sciences have their roots in mathematics and basic sciences.
- Engineering design is the process of devising a system, component, or process to meet desired needs.

c) A general education component that complements the technical contents of the curriculum and is consistent with the program and institution objectives.

d) Students must be prepared for engineering practice through a culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints. The teaching methods enhance student learning in the department by:

- Provides a full-time teaching staff appropriate in number and diversity of experience and competencies.
- Cover members of the faculty all fields of knowledge of the specialty.
- Academic qualification for new faculty members.
- Academic Development continued to faculty members to keep abreast of new developments.
- The impact of scientific research to faculty members on the educational process.

Program syllabus

B.Sc. degree in Information & Communication Engineering

Table(9): The syllabus, units and weekly hours for the **first year** in the information &communication Engineering Department.

First stage - 1st Semester					
Code	**Subject**	**Weekly hours**			**Units**
		Theory	**Tutorial**	**Lab.**	
IC101	Mathematics I	**2**	**1**	**0**	**2**
IC102	Engineering Drawing	**1**	**0**	**2**	**2**
IC103	Physics of Electronic Devices	**3**	**0**	**0**	**3**
IC104	Electric Circuit Theory	**2**	**1**	**0**	**2**
IC105	Electric Circuit Lab	**0**	**0**	**3**	**2**
IC106	Computer Programming	**2**	**1**	**0**	**2**
IC107	Computer Programming Lab	**0**	**0**	**3**	**2**

IC108	Human Rights	**1**	**0**	**0**	**1**
IC109	Academic English I	**1**	**0**	**0**	**1**
Total		**12**	**3**	**8**	**17**
		23			

First stage –2nd Semester					
Code	**Subject**	**Weekly hours**			**Units**
		Theory	**Tutorial**	**Lab.**	
IC110	Mathematics II	**2**	**1**	**0**	**2**
IC111	Structured Programming	**2**	**1**	**0**	**2**
IC112	Structured Programming Lab	**0**	**0**	**3**	**2**
IC113	Electronic Devices & Circuit	**2**	**1**	**0**	**2**
IC114	Electronic Devices & Circuit Lab	**0**	**0**	**2**	**1**
IC115	Digital Electronics	**2**	**1**	**0**	**2**
IC116	Digital Electronics Lab	**0**	**0**	**2**	**1**
IC117	Data Analysis and Visualization (MATLAB)	**0**	**0**	**3**	**2**
IC118	Democracy	**1**	**0**	**0**	**1**
IC119	Academic English II	**1**	**0**	**0**	**1**
Total		**10**	**4**	**10**	**16**
		24			

Table(10): Syllabus, units and weekly hours for the **second year** in the information &communication Engineering Department.

Second stage - 1st Semester					
Code	**Subject**	**Weekly hours**			**Units**
		Theory	**Tutorial**	**Lab.**	
IC201	Signal & Systems I	**3**	**0**	**0**	**3**
IC202	Probability and Random Processes	**3**	**0**	**0**	**3**
IC203	Electromagnetic Fields & Propagation	**2**	**1**	**0**	**2**
IC204	Electronic Systems	**2**	**1**	**0**	**2**
IC205	Electronic Systems Lab	**0**	**0**	**2**	**1**
IC206	Object Oriented Programming	**2**	**1**	**0**	**2**

IC207	OOP Lab	**0**	**0**	**2**	**1**
IC208	Microprocessor	**2**	**1**	**0**	**2**
IC209	Microprocessor Lab	**0**	**0**	**2**	**1**
IC210	Arabic Language	**1**	**0**	**0**	**1**
Total		**15**	**4**	**6**	**18**
		25			
Second stage –2nd Semester					
Code	**Subject**	**Weekly hours**			**Units**
		Theory	**Tutorial**	**Lab.**	
IC211	Signal &Systems II	**3**	**0**	**0**	**3**
IC212	Analogue Communication	**2**	**1**	**0**	**2**
IC213	Analogue Communication Lab	**0**	**0**	**2**	**1**
IC214	Antenna Theory	**2**	**1**	**0**	**2**
IC215	Web Design & Development	**2**	**0**	**0**	**2**
IC216	Web Design Lab	**0**	**0**	**3**	**2**
IC217	Programming Paradigms	**2**	**1**	**0**	**2**
IC218	Programming Paradigms Lab	**0**	**0**	**3**	**2**
IC219	Digital System Design	**2**	**1**	**0**	**2**
IC220	DSD Lab	**0**	**0**	**2**	**1**
Total		**13**	**4**	**10**	**19**
		27			

Table (11): Syllabus, units and weekly hours for the **third year** in the Information & Communication Engineering Department.

Third Stage – 1st Semester					
Code	**Subject**	**Weekly hours**			**Units**
		Theory	**Tutorial**	**Lab.**	
IC301	**Digital Signal Processing**	**3**	**0**	**0**	**3**
IC302	**DSP Lab**	**0**	**0**	**3**	**2**
IC303	**Digital Communication**	**3**	**0**	**0**	**3**
IC304	**Information Theory**	**3**	**0**	**0**	**3**
IC305	**Networks**	**3**	**0**	**0**	**3**
IC306	**Networks Lab**	**0**	**0**	**3**	**2**

IC307	Data Structure	3	0	0	3
IC308	DS Lab	0	0	3	2
IC309	Computer Architecture	3	0	0	3
Total		18	0	9	24
		27			

Third Stage – 2nd Semester					
Code	Subject	Weekly hours			Units
		Theory	Tutorial	Lab.	
IC310	Technical Assignment(mini Project)	1	0	3	3
IC311	Digital Communication System	3	0	0	3
IC312	Digital Communication Lab	0	0	2	1
IC313	Error Control Coding	3	0	0	3
IC314	Network Protocols	3	0	0	3
IC315	Network Protocols Lab	0	0	3	2
IC316	Computer Algorithms	3	0	0	3
IC317	Computer Algorithms Lab	0	0	2	1
IC318	Data-Base Design	2	0	0	2
IC319	Data-Base Design Lab	0	0	3	2
Total		15	0	13	23
		28			

Table (12): Syllabus, units and weekly hours for the **fourth year** in the Information & Communication Engineering Department.

Code	Subject	Units	Weekly hours			Weekly hours For Second		
			Theory	Lab.	Tutorial	Theory	Lab.	Tutorial
434ICIA1	Internet Architecture	**4**	**2**			**2**		
435ICIS	Information system analysis design	**6**	**2**	**2**	**-**	**2**	**2**	**-**
436ICOS	Operating systems	**6**	**2**	**2**	**-**	**2**	**2**	**-**
437ICCN	Computer Networks	**6**	**2**	**2**	**-**	**2**	**2**	**-**
438ICCR	Cryptography	**4**	**2**	**-**	**1**	**2**	**-**	**1**
439ICSC1	Satellite Communications	**4**	**2**	**-**	**1**	**2**	**-**	**1**
440ICOP	Optical communications	**4**	**2**			**2**		
44	Project	**4**	**1**	**2**	**-**	**1**	**2**	**-**
441ICCL	Communications Lab	**2**	**-**	**3**	**-**	**-**	**3**	**-**
Total		**40**	**15**	**11**	**2**	**15**	**11**	**2**

Weekly hours		28			28		

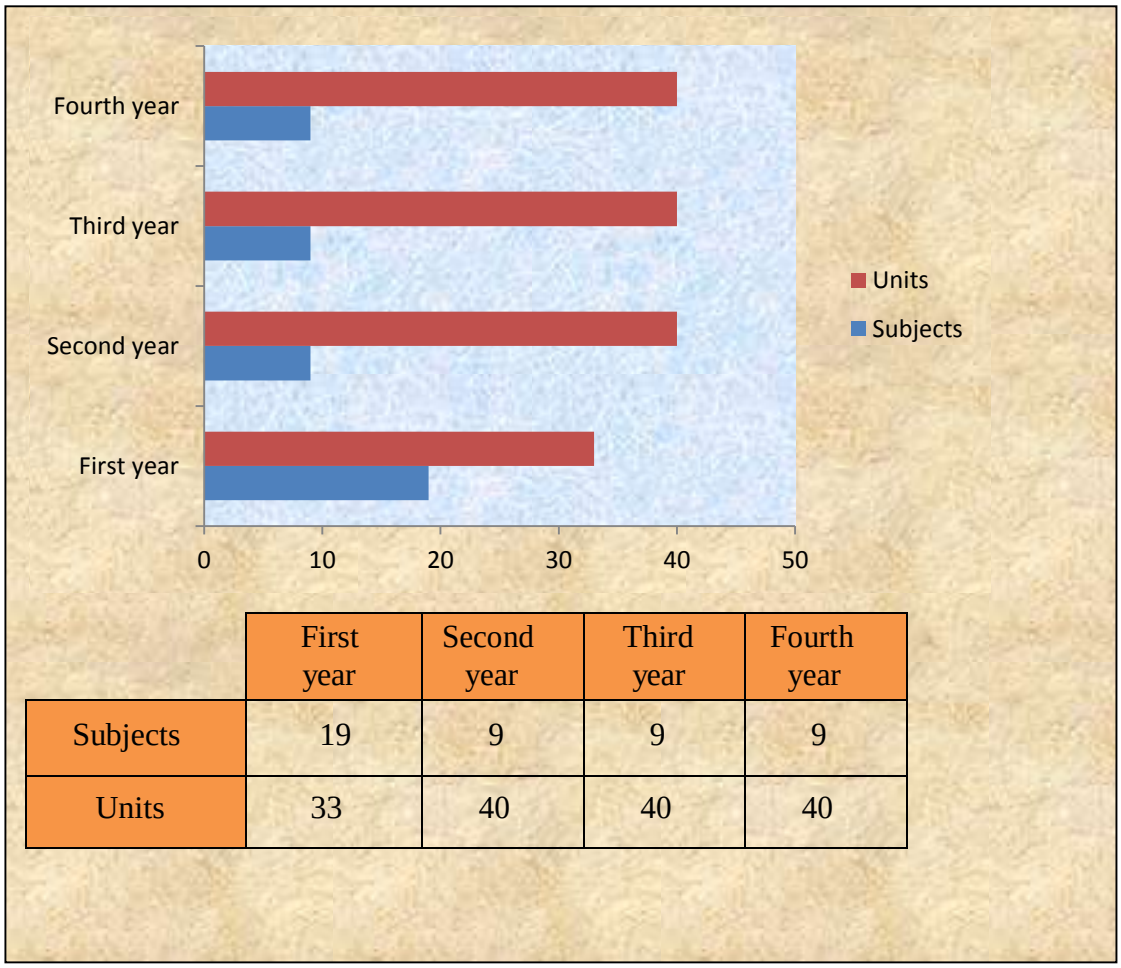
Table (13): Syllabus, units and weekly hours for the **third year** in the Information & Communication Engineering Department (Information and **Multimedia** Communication Branch).

Code	Subjects	Units	Hours / week					
			First term			Second term		
			Theory	Lab	Tutorial	Theory	Lab	Tutorial
442ICSC2	Satellite Communication	4	2		1	2		1
443ICIA2	Internet Architecture	4	2			2		
444ICDA	Elective subject (Data compression)	6	3		1	3		1
445ICVP	Audio –Video Processing	6	3		1	3		1
446ICMM	Multimedia System	6	2	2		2	2	
447ICDE	Database & software Engineering	6	2	2		2	2	
448ICPR2	Project	4	1	2		1	2	
449ICPL	Audio-video production LAB	2		3			3	
Total		38	15	9	3	15	9	3
Weekly hours			27			27		

Code	Subjects	Units	Hours / week					
			First term			Second term		
			Theory	Lab	Tutorial	Theory	Lab	Tutorial
326ICCN	Computer Network	**4**	**2**	**-**	**2**	**2**		**2**
327ICSP2	Digital Signal Processing	**4**	**2**		**1**	**2**		**1**
328ICCA2	Computer Architecture	**4**	**2**			**2**		
329ICDC2	Digital Communicatio	**6**	**2**	**2**	**1**	**2**	**2**	**1**
330ICIC2	Information & Coding theory	**4**	**2**		**1**	**2**		**1**
331ICIP	Image Processing	**6**	**2**	**2**		**2**	**2**	
334ICPE	Multimedia Production	**4**	**2**		**2**	**2**		**2**
335ICGR	Computer Graphics and Animation	**6**	**2**	**2**		**2**	**2**	
Total		**38**	**16**	**6**	**7**	**16**	**6**	**7**
Weekly hours			**29**			**29**		

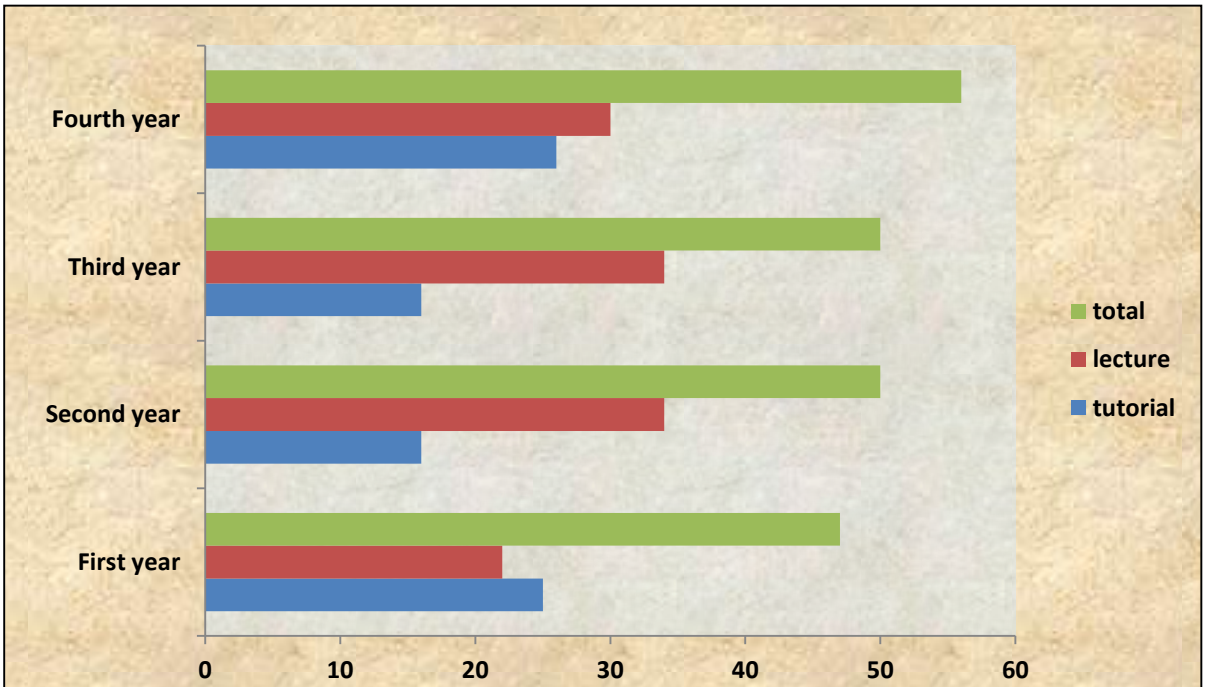
Table (14): Syllabus, units and weekly hours for the **fourth year** in the Information & Communication Engineering Department (Information and Multimedia Communication Branch).

Figures (6) and (7) show the number of units, subjects and the weekly hours of study for all stages in undergraduate study. Figure (8) shows the percentage of units and subjects distributed according to the requirements of the university, basic sciences, general specialty and specific specialty.



	First year	Second year	Third year	Fourth year
Subjects	19	9	9	9
Units	33	40	40	40

Fig.6: Number of subjects and units for the four years of study for undergraduate study.



	First year	Second year	Third year	Fourth year
tutorial	25	16	16	26
lecture	22	34	34	30
total	47	50	50	56

Fig.7: Number of weekly hours for the undergraduate study.

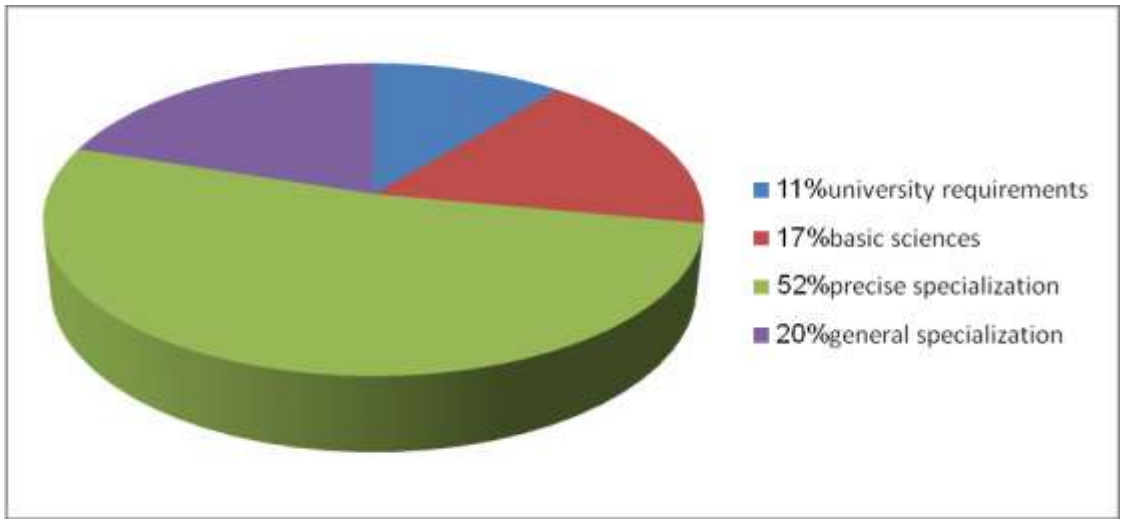


Fig.8: Percentage breakdown

Program syllabus for the first year

Mathematics:

Functions, Application of definite integrals (area between curves, volumes, … etc), Hyperbolic function, methods of integration, vector algebra, approximations integrals, Partial differentiation, Polar coordinates, Taylor series, ordinary differential equations, partial differential equations, multiple integrals.

Physics of Electronic Devices:

Introduction, energy levels, atomic structure, semiconductors, Si, Ge, and compound semiconductors, diode circuit application, Zener and photodiode LED, bipolar transistor circuit application, field effect transistor (FET).

Digital Electronics:

Numbering systems and arithmetic operations, Codes, Boolean algebra and logic gates, Combinational logic, Sequential circuits: Flip flops: RS, D, JK and T flip flops, Counters: Ripple counters, BCD counters, Up-Down counters, Shift registers: Unidirectional and Bidirectional shift registers, Parallel to serial converters.

Electric Circuit Theory:

Basic concept and units, analysis of DC circuit, alternating quantities, analysis of single phase AC resonant circuits, magnetic circuits, transient state in RLC circuits, three phase system, two port networks.

Computer Programming:

Introduction to computers, definition and classification of computers, functional units (input, output, CPU, and memory), computer organization, and introduction to computer software concepts, computer programming languages (levels, Types…), system, programming, and processing types.

Structured Programming:

Programming fundamentals, declaration (data types), assignment Statements, expression, input / output statements, iteration statements, user defined data type, subprograms, pointers, files.

Engineering Drawing:

Introduction, computer & engineering drawing, 2D drawing-Basic elements (line, arc, …etc), viewing & editing drawing, setting element properties (color, line, type, layer, ...etc), enhancing engineering drawing (text, and dimensions), use advanced drawing technology in engineering design (poly lines and blocks) in engineering design, engineering drawing technology (paper space and plotting), 3D drawing, write frame, surfaces model, and solid model, editing 3D drawing, programming with drawing (introduction to VBA).

Data Analysis and Visualisation:

Introduction, Graphical Techniques, Geometry of Curves, Integrating Databases and Data Transfer, Introduction to Mat lab, Applications Using Mat lab, Representing objects.

Academic English:

Revision of grammatical structures with emphases on technical usage, augmentation of technical vocabulary, dictionaries. Precise writing, descriptive and reflective paragraphs writing, Practice in presentation of passage original idea in a summary form, writing original compositions on themes connected with passages. Technical writing, clear and accurate writing on themes of common and technical English, theme discussion, beginning of essay, theme development, logical and effective conclusion, professional letter writing, note taking, special English for electrical and mechanical engineering, reading and listening comprehension.

Human Rights:

- The historical fundamental base of the human right and its development in our nation
- Human right in old age
- Human right links to low and out border educational
- General view of freedom

- Historical development of freedom
- Designation of the freedom
- Classification of the freedom.

Program syllabus for the second year

Electronic Systems:

Difference Amplifier, Operational Amplifiers application linear & nonlinear, Active filters (LP, HP, BP, and BS), Timing circuits, digital to analogue & analogue to digital converters, sinusoidal oscillators.

Analog Communication:

Introduction (Elements of Communication System), Electrical Filters, Transmission Lines, Signal Analysis, Amplitude Modulation AM, Angle Modulation, Random Signal Theory, Noise in Analog Communication Systems.

Electromagnetic Fields, Prorogation:

Fundamentals of Electromagnetic Analysis, Electrostatics, The Steady Magnetic Field, Maxwell's Equations, Electromagnetic Waves, Pointing Vector and The Flow of Power, Guided Waves, Wave Guides.

Antenna Theory:

Fundamentals of Antennas and Antenna Parameters, Basic Antenna Types, Radiation and Radar Equation, Troposphere Propagation.

OOP:

C-language Review, Function Overloading, Default value function parameters. Classes, Member function, member variables, Access specifies, This operator, References, Constructor & Destructor, Operators overloading. Conversion form built -in data types to classes and vice versa, Pointer member variable, Friend function & classes, Static Members, Inheritance Polymorphism &function over riding, Templates, name Spaces, Error Handling.

Signals and Systems I :

Fourier series, Fourier Transform, Lap lace Transforms.

Signals and Systems I I:

Z-Transform, Matrices, and Numerical Methods.

Microprocessor:

Introduction to Microprocessors and Microcomputers, the 8086 Microprocessor, The SDK-86 Microcomputer, Memory Interface of The 8086 MP, Input/Output Interface of the 8086 Microprocessor, Interrupt Interface of the 8086 MP, Introduction to 32 & 64 bit microprocessor.

Program syllabus for the third year /Information and Communications Engineering Program

Digital Communications Systems:

Signal Analysis and Representation Classification of signals and systems, Fourier series and F-T, Parse Val's power theorem, Raleigh's energy theorem. Convolution theorem: (time convolution theorem, frequency convolution theorem, prepares of convolution, graphical interpretation), response of linear system, Sampling Theorem, Pulse Modulation, PAM, PDM, PCM, DPCM, ADPCM DM, ADM. Matched Filter. Digital modulation system: ASK, FSK, PSK, DPSK, demodulation, carrier recovery, M-ray PSK modulation, & M-ary FSK modulation, Traffic Theory. Spread Spectrum System.

Digital Signal Processing:

Signals & Linear Systems: Basic Concepts, Discrete Linear Systems (Sequence Manipulation, Solution of a Linear Constant Coefficients Difference Equation), The Z-Transform, Solution of Linear Constant Coefficient Difference Equations Using z-Transform, Response of Linear Discrete Systems, Linear and Circular or Cyclic Convolution Methods, Fourier and Fast Fourier Transform, Digital Filters, Introduction to Computer Vision and Image Processing, Image Analysis.

Information & Coding theory:

Communication Systems & Information Theory, A Measure of Information, Communication Channels & Capacity, Source Coding, Error Control Coding.

Database Design:

Introduction to DB Processing – DB Development (DB, DBMS, Creating the DB) – The Entity Relation Model (DB elements, Network, Hierarchical, Relational models) – DB design (Relational Model DB, Normalization) – DB design using ERD (Relational Algebra, SQL) – db Application using Internet Technology (Network environment, 3 Tier Architecture, DB Web Server).

Data Structures & Computer Algorithms:

Definition: Data Structures and Algorithms, Data Types and Abstract Data Types (ADT)(with C++ for Lab), Fundamentals of Data Structure (Static Structure, Dynamic Structure, Searching and Storing Algorithms, Files and Data Base).

Computer Architecture:

Review of Digital Circuits, Register transfer and Micro- Operation, Basic Computer Origination and Deign, Programming the Basic computer, Micro programmed control, The Central Processing unit.

Program syllabus for the third year /Information and Multimedia Communications Engineering Program

Computer Network:

Introduction and basic concepts, the OSI model, signals encoding, transmission of digital data and interfaces, transmission media, error detection and correction, data link layer controls and protocols, local area networks, data switching and routing, internetworking devices, transport layer and upper OSI layers, network performance, standard protocols and services.

Computer Architecture:

Review of Digital Circuits, Register transfer and Micro- Operation, Basic Computer Origination and Deign, Programming the Basic computer, Micro programmed control, The Central Processing unit.

Digital Communications:

Signal Analysis and Representation Classification of signals and systems, Fourier series and F-T, Parse Val's power theorem, Raleigh's energy theorem. Convolution theorem: (time convolution theorem, frequency convolution theorem, prepares of convolution, graphical interpretation), response of linear system, Sampling Theorem, Pulse Modulation, PAM, PDM, PCM, DPCM, ADPCM DM, ADM. Matched Filter. Digital modulation system: ASK, FSK, PSK, DPSK, demodulation, carrier recovery, M-ray PSK modulation, & M-ary FSK modulation, Traffic Theory. Spread Spectrum System.

Information & Coding theory:

Communication Systems & Information Theory, A Measure of Information, Communication Channels& Capacity, Source Coding, Error Control Coding.

Computer Graphics & Animation:

Bitmapped Images: Resolution, Compression, Mapping techniques: Filletring, Warping, Composition & morphing, Shading, Consistent color, 3D animation: Kinematics, Dynamics, planning, & Learning

Image Processing

Introduction, Digital image representation, how to read, display and write images. Data classes, Image types, converting between data classes and image types. Array indexing, Introduction to M-File function programming. Image enhancement in the spatial domain: Image enhancement in Frequency Domain, Image Restoration, Image Segmentation, Colour Image Processing. Image Compression

Multimedia Production Engineering

Lighting Theory: (Design consideration. General lighting theory. Theatrical lighting theory. Straight of viewing. Multiple viewing angles. Expanded.) Colour theory: (Lighting application, lighting areas determination. Types and uses of fixtures. Design processes.) Video Timing: (Digital Over scan, ITU-R BT.601, H Sync, V Sync and Blank Timing.) Digital Video Interface: (T.M.D.S protocol specifications. Link architecture, Clocking, Synchronization, Encoding, Encoder specification, Channel mapping. Error handling. SDI, PDI, SDTI, DVI and HDMI. Video measurements), Digital video processing: (Intra-frame coding, Inter-frame coding, Alternative Color Spaces: YUV, YIQ, YDbDr Color Space, HSV Color Space), Video Camera Image Conversion principle: (Pick-Up devices. Lenses &Zoom)

Digital Signal Processing:

Signals & Linear Systems: Basic Concepts, Discrete Linear Systems (Sequence Manipulation, Solution of a Linear Constant Coefficients Difference Equation), The Z-Transform, Solution of Linear Constant Coefficient Difference Equations Using z-Transform, Response of Linear Discrete Systems, Linear and Circular or Cyclic Convolution Methods, Fourier and Fast Fourier Transform, Digital Filters.

Program syllabus for the fourth year/Information and Communications Engineering Program

Information System Analysis and Design:

Information system analysis and design concept (SAD, IT, Information system building blocks) system development life cycle phases (Planning, Analysis, Design, Implementation), system development methodology (what is methodologies, Structured design development, rapid application development, selecting the appropriate methodology), tools support system development (CASE tools, Microsoft project management), modeling system requirement, (data flow diagram, process flow diagram), system design strategies (elements, selecting strategies), system design tasks (DB design, user interface design, network design).

Satellite communications:

History of the satellite, applications of the satellite, types of satellite, orbit equation, block diagram satellite, and Sub satellite, received signal: calculate the power transmitted from the earth station to satellite, effective of rain, snow, ice, atmosphere, ionosphere, temperature, and the noise on the power signal, noise temp, noise figure, and system noise temperature, modulation, and multiplexing: FDM, TDM, CDM, Multi-channel per carrier for analogue and digital transmission, Multiple accesses techniques, FDMA, TDMA, and CDMA. Digital Communication Process via Satellite: Types of coding, Decoding, and Calculate the code gain.

Computer Network:

Introduction and basic concepts, the OSI model, signals encoding, transmission of digital data and interfaces, transmission media, error detection and correction, data link layer controls and protocols, local area networks, data switching and routing, internetworking devices, transport layer and upper OSI layers, network performance, standard protocols and services.

Operating Systems:
Computer system overview, operating system overview, definition, processes management, CPU scheduling, process synchronization, memory management, file management, and network operating system.

Internet Architecture:
Networks essentials, internet services, IP addresses and sub netting, Ethernet frame format, IP header format, TCP & UDP header format, SLIP, PPP, ARP, DNS, bridges, routers and routing protocols, HTTP protocol, FTP protocol, DHCP, internet security, introduction to Web pages development.

Cryptography and Data Security:
Introduction, classical cipher systems, stream ciphers, block cipher, public key cryptography, practical security, introduction to computer viruses, information security and safeguarding, information hiding (watermarking, steganography).

Optical Communications:
Optical background, optical fiber communication system, optical fibers, optical sources, optical detectors, overall system, application, and case study.

Engineering Project
Application as a part of graduating requirement

Communications lab
Amplitude shift keying modulation and demodulation, Frequency shift keying modulation and demodulation, Phase shift keying modulation and demodulation, Differential Phase shift keying modulation and demodulation, Phase-locked loop, Direct frequency synthesizer, optical communications.

Program syllabus for the fourth year /Information and Multimedia Communications Engineering Program

Audio & video processing
Audio processing: Fundamental of digital audio, Sampling & oversampling, Dithering, jitter, Quantization, Noise reduction, Filtering, A/D & D/A conversion, μ .Law & A. Law, Audio compression, Equalization, Coding techniques, Subbed coding, Transform coding, Mp3. Spectral analysis, Disc recording, CD, DVD, tape, Wi-Fi Audio

Video processing:-Digital video Fundamentals, Motion detection, Video coding, MPEG1,2,4, Camera picup devices, Resolution, Video Bandwidth, Monocrome & color signals, Color spectrum, Basic features of NTSC & PAL/SECAM syst., High definition TV & Digital TV, IPTV systems

Cryptography and Data Security:
Introduction, classical cipher systems, stream ciphers, block cipher, public key cryptography, practical security, introduction to computer viruses, information security and safeguarding, information hiding (watermarking, steganography)

Internet Architecture:

Networks essentials, internet services, IP addresses and sub netting, Ethernet frame format, IP header format, TCP & UDP header format, SLIP, PPP, ARP, DNS, bridges, routers and routing protocols, HTTP protocol, FTP protocol, DHCP, internet security, introduction to Web pages development.

Satellite communications:

History of the satellite, applications of the satellite, types of satellite, orbit equation, block diagram satellite, and Sub satellite, received signal: calculate the power transmitted from the earth station to satellite, effective of rain, snow, ice, atmosphere, ionosphere, temperature, and the noise on the power signal, noise temp, noise figure, and system noise temperature, modulation, and multiplexing: FDM, TDM, CDM, Multi-channel per carrier for analogue and digital transmission, Multiple accesses techniques, FDMA, TDMA, and CDMA. Digital Communication Process via Satellite: Types of coding, Decoding, and Calculate the code gain.

Data Compression

Introduction, review of information theory, Run-length coding, variable length coding, lossless image compression. audio quality, distortion measure, rate distortion theory, uniform and non-uniform, vector quantization, signal to quantization noise, Transform coding DCT, ADPCM, Vocoders, MPEG audio compression, image compression standards, video compression techniques.

Database and software engineering

Introduction to Data Base: the Data Base Processing, Four DB Application, DBMS, File Processing System, DB Processing System The Relation Model: data base Elements, Entity Relationship Diagram, elements of DBD, Functional dependencies, The Normalization: Modification Anomaliesm, The essence of normalization, NF(normal forms), Domain/Key NF, Software processes methods, Process activity and relational process, Agile software development: Extreme programming, Requirements engineering processes, System modeling: Context model and interaction model, Architectural design, Software testing, Distributed software engineering.

Multimedia Systems and Applications

Fundamentals of multimedia: media and data streams, sound/audio, image, graphics, video and animation, video-on-demand, interactive television, Hypermedia courseware and groupware, Audio/Video fundamentals: analog and digital representations, human perception, Audio/video equipment and applications, Multimedia Computer technology: communications architecture (Multimedia Network Fundamentals, Multimedia Protocols for the Internet, Multimedia Networking Services), multimedia workstations, cache systems, storage systems and optical storage, Multimedia operating system: real-time operation, resource management, process management, file systems, and Multimedia networking. Multimedia synchronization: presentation requirements, reference model, and synchronization techniques. Multimedia applications: digital libraries, system software, toolkits, conferencing paradigms, structured interaction support, and examples from video/audio/graphics conferencing.

Engineering Project

Application as a part of graduating requirement

SWOT Analysis

1- Strengths:

- Generally, the courses credit hours are adequate for department, college and university requirements.
- English Language is classified as a department requirement.

2- Weakness:

- The evaluation and change of syllabus is suggested by the lecturer for each subject.
- The syllabus change procedure is depending on the ministry approval due the the laws restrictions.
- Absence of Statistical Engineering courses.
- Absence of community service course.
- The lectures are assigned to pursue administrative objectives that overcome on their scientific missions and duties.

- Lack of encouragement to the activities of entertainment like sport and arts.
- Absence the supporting of training abroad.
- Lack of support to pursue participation in scientific journals.

3- Opportunities:

- The ministry permits syllabus change with a ratio of 20%.
- Ministries, other than the ministry of higher education and scientific research, provide a support to the graduation project such as the ministry of youth and sport.
- The ministry supports the training staff abroad.

4- Threats:

Graduated engineers have inadequate experimental and industrial experience

Criterion 5- Information and Communication Engineering Department

The Head of Department

The department is managed by Dr. Lwaa Faisal Abdulameer. He has a doctorate from department of Electronics and Communication Engineering/ National institute of Technology/ India in 2014. Dr. Lwaa has a specialization in wireless communication and microwave.

He manages the department since February 2017. He has more than twenty two years of experience of his career and academic work. In addition, he held several positions and functions.

Asst. Lecturer Heba M. Fadhil assisted in the management of department during his position as coordination, he known for its high level for the scientific and administrative. In addition to head and coordination of the department, there are Department Council and the Scientific Committee to discuss and decide on strategic matters relating to the academic policy of the department.

Responsibilities and powers of the Department

The most important duties of the head of department are:

1. Assessment, quarterly or yearly, of the performance of the department academic process, and remove all difficulties faced by the course program of the department.
2. Tracking and performance assessment of teacher in terms of commitment to academic vocabulary for each subject and teaching ability in the transfer of scientific material for the student are clear.
3. Monitoring students in terms of their application to the instructions and their informants in terms of general appearance of the student uniform dress compliance and university attendance and commitment, monitoring student absence periodically and find out the reasons for their absence. Tracking student in the level of acceptance and understand of scientific subject content. Help the student to overcome any problems they may encounter in the academic year and encourage and guidance them continuously to ensure that the scientific material to them carefully and responsibility by the teachers. Achieve the main objective of the study the student and the goal of obtaining a high level of scientific specialization in the field after the end of his university studies.
4. Seek to provide all the requirements of the success of the educational process to the department, by providing appropriate classrooms with all the accessories. Provide laboratories and workshops with all the modern machinery and equipment from best supplier resources. Provide means of teaching aids equipment to help students to easily understand of scientific material of subjects.

5. Develop curriculum on an annual basis and seek to match them with the vocabulary of subjects in the corresponding departments of the universities in the worldwhichareknownashighscientificsobrietyandworld-classsciencewith program syllabus that match the currently very high rate with the corresponding engineering departments in universities in the world.

The Department

Academic staffs are selected from advanced degrees' holder in various disciplines related to scientific and academic sides for the department special field. PhD and MSc Holders are granted to them from the universities of UK, Poland, Germany, china, Czech, India and Iraq. Their specialties are cover information engineering, electronics and communication engineering, electrical and computer engineering, control systems engineering.

Figures 9 to 11 illustrate department staff distribution according various aspects such as their position, academic degree, and academic rank.
Figures 12 and 13 show how many academic staff how are joined scholarship to obtain Ph.D. or M.Sc. degrees, and also show the distribution of them according state where the study.

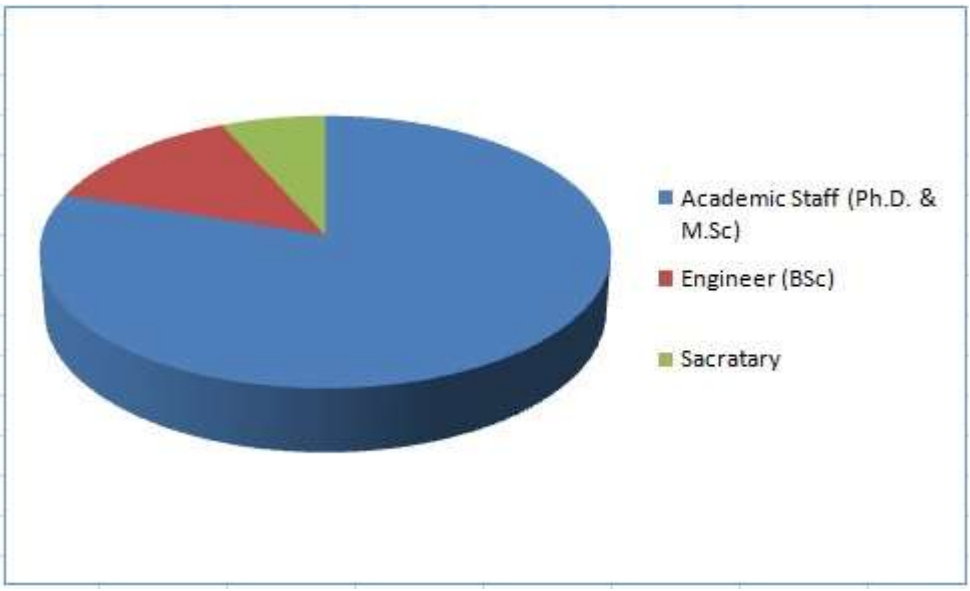


Fig.9: Classification of department staff according to their position.

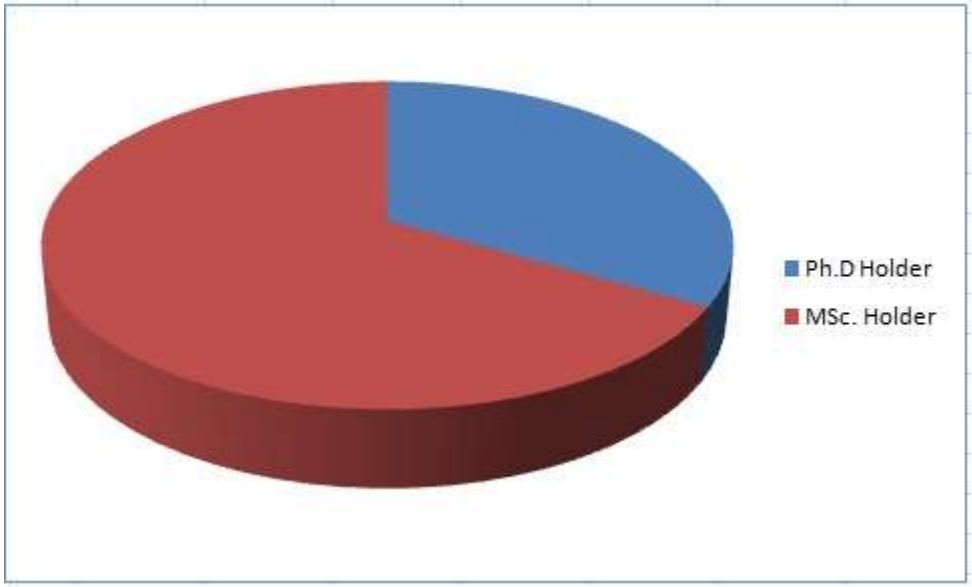


Fig.10: Number of PhD holder vs MSc.Holder.

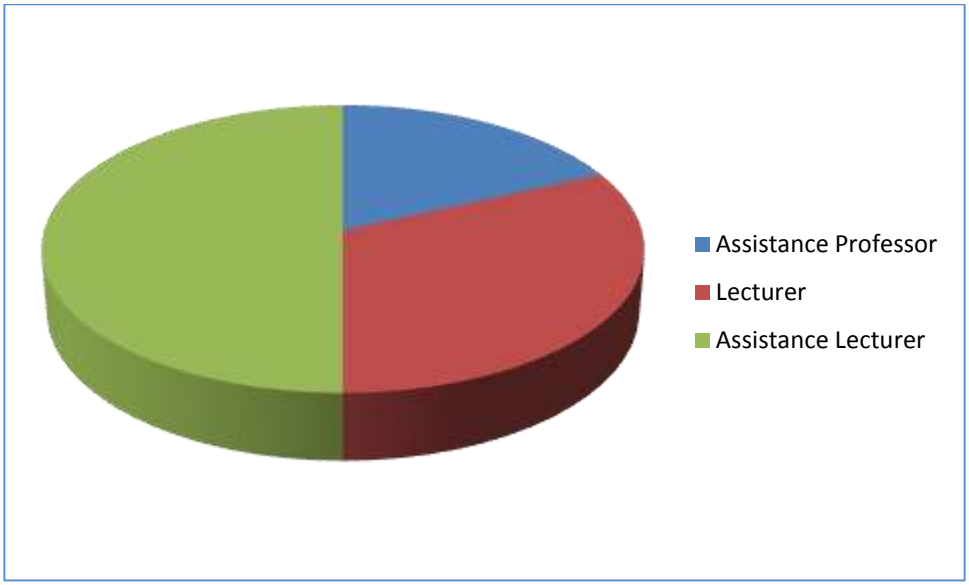


Fig.11: Academic staff classification according to scientific rank.

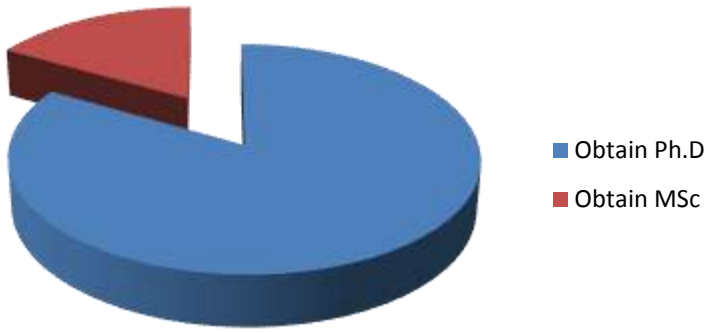


Fig.12: Number of staff joined scholarship to obtain Ph.D. or MSc. Degree

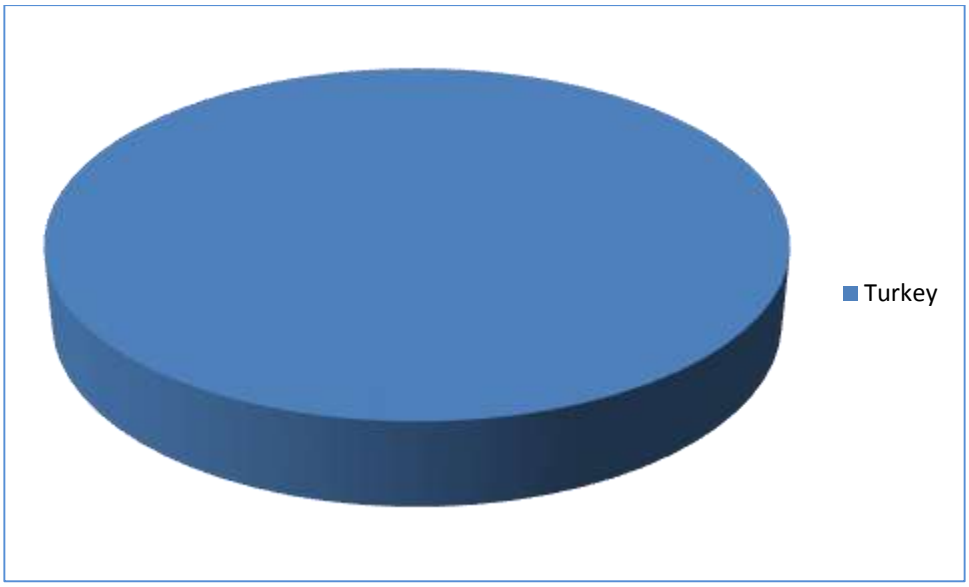


Fig.13: Number of Scholarships Students Distributed According States.

Qualifications of Department

The academic staffs in the Information and Communications Engineering Department are selected from high scientific level of the advanced degrees holder in various disciplines related to scientific and academic sides for the department special field. PhD and Master Holders are granted from the universities of UK, Poland, Germany, china, Czech, India and Iraq. The academic staffs have various ranks of scientific level assistant professor, lecturer and assistant lecturer. The academic staffs are qualified to perform academic work and the teaching profession is an excellent. They are, also enrolled in several courses for qualifying in the study of how the performance of the teaching profession and the transferring of scientific material to the student in a clear way of learning through the

preparation of lectures and demonstration of how to use the means of teaching aids at the lecture as well as how to support the theory lessons by practical side of laboratory.

The academic staffs have specialties cover engineering fields, such as electronics and communication engineering, electrical and computer engineering, control systems engineering, Information Engineering and Systems and computer science.

Some of master holders of academic staffs are scholarship joined to obtain a doctorate degree in various universities Germany, UK, and Iraq. They have proved their merit and solid scientific base-scientific sober when to send them as students, scholarships for doctoral studies in various international universities. In addition, the academic staff continued to contact the hard reality and the practical applications of their specialist within the country through joint contributions through visit of different ministries such as the Ministry of Science and Technology and the Ministry of Communications and private companies. Join contracts with these companies to exchange of scientific opinions and enhance the theoretical work sides practically for service the teaching process and social. Most of academic staff are participated and attended of many seminars, lectures and scientific conferences within and outside the country. They have achieved many of qualify scientific research are submit in scientific journals published in the Iraq, USA, Korea, Finland, Canada, Germany and India.

In addition to this, the department includes a group of excellent engineers hold bachelor's degree in interdisciplinary engineering, such as information engineering, electronics and communication engineering, electrical and computer engineering, control systems engineering. This group of engineers is work under the various engineer position job titles such as engineer, assistant engineer. Some of them are jointed to obtain master's degree at Turkey, Germany and Iraqi universities.

Faculty Size:

The faculty of the department works in cooperative community to maintain many tasks and scientific activities; we can show them specifically as below:

- Doing seminars on an annual basis and in the presence of a wide range of different ministries concerned with the subject.
- The establishment of lectures and courses (such as intranet introduction course - network intercom system for the College) and scientific advice through the Advisory Office of the College.
- Scientific and research cooperation with the Ministries of Science and Technology and the Ministry of Communications and others.
- The signing of the cooperation mechanism with the Iraqi Media Network in order to open a branch within the department serves the orientations of the Iraqi Media Network.
- acceptance of the draft system of elections using electronic Barcode by the Electoral Commission in Iraq and accept the post of project conference of the Electoral Commission II, winning the first prize of the Festival of sovereignty, which was involved by the scientific student conference in Qatar.
- Some members of the department working as a member of several committees

within the college.

- Some members of the department working as a member of many international organizations such as the World Organization for electrical engineers and electronics IEEE and the Organization of American Fulbright.
- Participation and completion of construction of the internal computer network within the college (Intranet).

Faculty Development:

The department mission is to study information and communication engineering, because of its necessity in many different fields, including economic, security, industrial, educational, and through the development of future plans for the development of the department:

1. Create a new generation of engineers and professionally able to update the infrastructure in the field of informatics and communications.
2. to communicate with the community to provide the required services through competence and providing services to the community through problem-solving scientific and technical facing the labor market and education is directed to serve the development of society.
3. to be graduates with the quality and adequacy distinct in their field through keep up with the latest technologies in the scientific and practical in the field of information and communication technology.
4. To maintain the ethics of the profession of teaching and academic excellence.

SWOT Analysis

Strengths

- The jurisdiction of the Information & Communication Engineering in Iraq is one of the modern disciplines, and that the country in need of this specialty.
- The members of the faculty in the department provide Information & Communication consulting to state institutions, companies and private sector factories.
- The graduation projects that are completed by the fourth year students in the department include the study / evaluation/treatment plant design to realistic Information & Communication problems in Iraq.
- Most of the researches in the department published in voluble foreign scientific Journals such as IEEE, ASCE, ASME, Elsevier Journals, etc.

Weaknesses

- The department need to modern and advanced laboratories.
- Because the jurisdiction of the Information & Communication Engineering from the modern disciplines in Iraq and the lack of adequate Information & Communication

awareness in the community, that led to the unwillingness of some students coming from high school to record in the Department of Information & Communication Engineering.

Opportunities

- Institutions of the state and the private sector in Iraq need Information & Communication engineers.
- Graduate students can access to real Information & Communication problems through the field work and their studies deal with real problems exists.
- Graduate student from the department that gets on the rate of 65% or more can apply for Master's study and compete with the other fellows.

Threats

- Fast development in technology.
- Lack in understanding the importance of Information & Communication engineering in all fields of communication unity life.
- Lack in understanding the size of Information & Communication problems in the country.

Criterion 6- Facilities

Facilities Review

Classrooms:

Department contains six classrooms are located on the second floor, with rectangular shape, four of them the average area of each room is 36m^2, and the other two are the average area 12m^2, thecapabilityoftheroomisupto40saddle, while the actual number of students per grade level ranges between (25–35), note that the number of news student according to the annual plan in the academics year is 40 students.

Halls are equipped with the saddles, a large white boards, platform lectures, teaching office of, air conditioning, and ceiling fans.

And the rooms include the display devices (LCD displays, smart board and Data show) in case of teacher need.

Note that there are several hall sand sports stadium sear marked for use by students of the Departments for sports activities and art and the Student Union and club student and sports stadiums and bath sand Health Hall and the Hall of the college library serve the interests of college students and are described below: Area of the college library 208m^2

Hall of art is tic activity and sports 16m^2

Student Union Hall 16m^2

Student Club Hall,150m^2

Sports stadiums 200m^2

Number of facilities and activities, cultural and student services, sports, health are 5halls of space per 88m^2. The building sand classrooms are efficient and appropriate for usage purposes.

Laboratory:
Department includes three rooms laboratories of somewhat adequate space, which is about 252m^2, containing different laboratory equipment (hardware apparatus and other devices), laboratories are equipped with devices and modern equipment of good sophisticated qualities, but never the less, it needs more, especially communication equipment that are developing in fast manner.
Laboratories occupied by students in the department, are as part of practical work to the subjects that are studied the erotically by students, which is an integral part of school curriculum, they are:

Department Laboratories:

1- Networking Laboratory: (area 6x9m^2)
- 1.1 Computer Network Lab
- 1.2 Information Technology Lab.
- 1.3 Auto CAD Lab.
- 1.4 Computer Aided Drafting and Design Lab.
- 1.5 Programming with C++ Lab.
- 1.6 Microprocessor Lab.

2- Communications and Electronics Laboratory: (area 6x9m^2)
- 2.1 Electrical Engineering Lab
- 2.2 Electronics I Lab.
- 2.3 Electronics II Lab.
- 2.4 Logic Lab.
- 2.5 Communications I Lab.
- 2.6 Communications II Lab.

3- Software Laboratory:(area 7x7m^2)
- 3.1 Object Oriented Programming Lab
- 3.2 Data Structure Lab.
- 3.3 Data Base Lab.
- 3.4 Operating Systems Lab.
- 3.5 Information System Analysis and Design Lab.

SWOT Analysis

1- Strengths:

- Most of faculty members are young.
- The available classrooms and laboratories are sufficient for the needs of the college at this time.

- The department supports INTRANET service.

2- Weakness:

- Lack of academic staff.
- The limitation of High degree and ranks, such as Ph.D. degree, and Prof., Asst. Prof ranks.
- Lack of research due to the absence of financial support, and laboratories.
- The limitation speed of the internet service.

3- Opportunities:

- Training abroad to increase the experience.
- Higher Education such as Ph.D. studies.
- Increase the rate of staff employment.
- Due to the nature of college, the presence of professional staff in engineering and planning this can improve these facilities.

4- Threats:

- Graduation the engineers with a low levels of skills.
- Decrement the working life of the machines and instruments due to bad use of unprofessional persons.

Criterion 7- Scientific Research and Outboard Relationships

Most researches were done in the various departments in the college are characterized as applicable researches and directed to the areas of department nature of specialization. Researchers are uses technical theories to solving problems, designing and developing devices which are useful for industry and society.

Departments work hard to strike a cooperative relationship with companies and industry for the purpose of counseling and guidance of their scientific researches in the field of solving problems in the industry

The following tables are list of achieved researches during last five years (2012-2018). The list of researches are being published in a scientific journals or conferences.

م.م بيداء محمد مشجل	An Efficient Selective Method for Audio Watermarking Against De-synchronization Attacks	Journal of Electrical Engineering & Technology	2018

م.م طارق عماد علي Ameer Morad	Load Balance in Data Center SDN Networks	International Journal of Electrical and Computer Engineering	2018
م.م هبة محمد فاضل	The Age of Miraculous Technology Advent to Eradicate Cancer Cells	ICSES Transactions on Image Processing and Pattern Recognition (ITIPPR)	2018
م.م هبة محمد فاضل	Cloud Precept: Storage, Backup, and Synchronization	ICSES Interdisciplinary Transactions on Cloud Computing, IoT, and Big Data (IITCIB)	2018
فاطمة بهجت ابراهيم	Real Time Face Recognition System based Hybrid Method	International Journal of Scientific Engineering and Applied Science (IJSEAS)	2018
فاطمة بهجت ابراهيم	Biometric National Identification Number Generation for Secure Network Authentication	Journal of Fundemantal and Applied Sciences	2018
Ameer Morad	Comparison between Epsilon Normalized Least means Square (ϵ-NLMS) and Recursive Least Squares	International Research Journal of Engineering and Technology (IRJET)	2018
أ.م.د سها محمد هادي	Design and Implementation an Industrial Application System by using Internet of Things (IOT)	Innovative Systems Design and Engineering	2018
Lwaa Faisal	Performance Analysis of FSO under Turbulent Channel Using OSTBC	مجلة النهرين الهندسية	2018
Ali salah Mahdi Lwaa Faisal Ameer Morad	Comparison between Epsilon Normalized Least means Square (−NLMS) and Recursive Least	IEEE conference	2018
Y. Al-Mathehaji, S. Boussakta, M. Johnston	Defeating SSDF Attacks With Trusted Nodes Assistance in Cognitive Radio Networks	IEEE sensors letters	2017
Y. Al-Mathehaji, S. Boussakta, M. Johnston	Reliable Broadcast over Cognitive Radio Networks: A Bipartite Graph-Based Algorithm	InTech Open Access book publisher	2017
Lwaa Faisal Abdulameer	CSK based STBC-CDMA System: Design and Performance Evaluation	مجلة اتحاد الجامعات العربية	2017

Fatima B. Ibrahim, Matheel E. Abdulmunem	Hybrid Face Recognition Algorithm for Wireless Sensor Network	Diyala Journal for Pure Sciences (DJPS)	2017
Fatima B. Ibrahim, Mahmood Kareem	Biometric National Identification Number Generation for Secure Network Authentication	International Conference on Communication, Management and Information Technology ICCMIT'17	2017
H. M. Fadhil	Accelerating Concealed ISB Steganography and Triple-DES Encryption using Massive Parallel GPU	Journal of Applied Sciences Research	2017
H. M. Fadhil	Concerted Digital Watermarking Algorithm Based on DWT-DLT Transformation and Henon	Journal of Applied Sciences Research	2017
H. M. Fadhil	Multi-Effectiveness Smart Home Monitoring system Based Artificial Intelligence through Arduino	Journal of Software	2017
Tariq Emad Ali	Load Balance in Data Center SDN Networks	Al-Salam Univercity Conference	2017
Ahmed Sattar	Underdetermined Convolutive Source Separation Using GEM-MU With Variational Approximated Optimum Model Order NMF2D	IEEE Trans. Audio, speech and language processing	2017
Y. Al-Mathehaji, S. Boussakta, J. Hussein	Primary receiver-aware opportunistic broadcasting in cognitive radio ad hoc networks	IEEE International Conference on Ubiquitous and Future Networks (ICUFN)	2016
H. Fakhrey, R. Tiwari, M. Johnston, YA Al-Mathehaji	The optimum design of location-dependent key management protocol for a WSN with a random	IEEE Sensors Journal	2016
J. Hussein, S. Ikki, Y Al-Mathehaji	Study of a multi-relay scheme and co-channel interference within an underlay cognitive radio network	IEEE-ICUFN International Conference on Ubiquitous and Future Networks	2016

Fatima B. Ibrahim, Matheel E. Abdulmunem	The Design of Efficient Algorithm for Face Recognition Based on Hybrid PCA-Wavelet	Iraqi Journal of Science, Vol. 57, No.2A, pp: 995-1006.	2016
Fatima B. Ibrahim, Matheel E. Abdulmunem	Design and Simulate an Efficient Algorithm for Biometric Recognition in Wireless Sensor Network	The 15th specialist Scientific Conference of Al Mansour University College, April 2016	2016
Fatima B. Ibrahim, Matheel E. Abdulmunem	Hybrid Face Recognition and ClassificationSystem for Real Time Environment	International Journal of Innovations in Engineering and Technology (IJIET)	2016
Fatima B. Ibrahim, Matheel E. Abdulmunem	Design of an Efficient Face Recognition Algorithm based on Hybrid Method of Eigen Faces and Gabor Filter	Iraqi Journal of Science, Vol. 57, No.3B, pp:2102-2110.	2016
Ali salah mahdi	A Comparison Between E-RLS and RLS of Tracking Rayleigh Fading Channel	Al_Khwarizmi Journal	2016
H. M. Fadhil ,M. Younis, Z. Nadhim	Acceleration of the RSA Processes based On Parallel Decomposition and Chinese Reminder Theorem	International Journal of Application or Innovation in Engineering & Management (IJAIEM)	2016
Tariq Emad Ali	Performance Enhancement of DSR Routing Protocol in VANET	International Journal of Innovative Research in Science, Engineering and Technology	2016
Tariq Emad Ali	Review and performance comparison of VANET protocols: AODV, DSR, OLSR, DYMO, DSDV & ZRP	Al-Sadiq College Conference	2016
Z. Ussama, T. Ziad	Compartive study between variable length error correcting codeand turbo code with orthogonal frequancy division multiplexing	International journal of engineering research	2016

Y Al-Mathehaji, S Boussakta, M Johnston, H Fakhrey	Crbp: A broadcast protocol for cognitive radio ad hoc networks	IEEE International Conference on Communications (ICC)	2015
H Fakhrey, S Boussakta, R Tiwari, Y Al-Mathehaji, A Bystrov	Location-dependent key management protocol for a WSN with a random selected cell reporter	IEEE International Conference on Communications (ICC)	2015
Dr Jamal Fadhil and Saja Majeed Mohammed.	Resource Description Framework schemas for E-Library.	Journal of Madenat al-elem College, vol. 7, no. 2, 2015	2015
Lwaa Faisal Abdulameer, Jokhakar Jignesh D., U. Sripati and Muralidhar Kulkarni	BER Performance Enhancement for Secure Wireless Optical Communication Systems Based on Chaotic MIMO Techniques	Nonlinear Dynamics. (SPRINGER), Vol. 75, No.1-2, 75:7–16.	2014
Khalifa Salim	Channel prediction based adaptive paket length for wireless communication	IJCSET journal, v.3 no. 1, 2014	2014
Fadhil H. M. and Younis M. I.	Parallelizing RSA Algorithm on Multicore CPU and GPU	IJCA journal, vol. 87, no. 6, pp. 15 – 22, 2014	2014
Khalifa Salim, Ibrahim Mohammed.	Design and implementation of web-based GPS-GPRS vehicle tracking system	IJCSET journal, v.3 iss. 12, 2013	2013
Lwaa Faisal Abdulameer, U. Sripati and Muralidhar	BER Performance Enhancement for Secure Wireless Communication Systems based on DCSK-	Radio electronics and Communications Systems (SPRINGER) Vol. 56, No. 10, pp. 481-492	2013
Ali salah mahdi Ergun ercelebi	Reduced number of pilot in comb-type pilot arrangement by using modified least square channel estimation for OFDM system	Signal Processing and Communications Applications Conference (SIU), 2013 21st	2013

Yaman E. Majeed, Ahmed K. Hasan	Design and implementation of a multiprocessor telephone exchange	IJECET journal, vol. 4, issue 6, Nov.-Dec 2013, pp. 49 – 56	2013
Muna M. Hummady, Zena A. Abed	Estimation of SNR including quantization error of multi-wavelength Lidar receiver	AL-Khwarizmi EngineeringJournal,23-4-2013	2013
Suha M. Hadi, Waiel R. Abdulmajeed, Maher M. Theeb	GPS development for gas pipeline leek detection location	Association Journal of Arab Universities for Studies and Research	2013
Khalifa Salim, Mohammed Abdalla and ZinahJaafar	WLAN integrated with GPRS network security	AL-Khwarizmi Engineering Journal, V.8, No.1, Feb 2012	2012
Khalifa Salim, Mohammed Abdalla	Channel estimation and prediction based adaptive wireless communication	AL-Khwarizmi Engineering Journal,V.8, No.2, May 2012	2012

SWOT Analysis

1. ***Strengths***

- These are great tends of college faculty members to pursue and carry out scientific researches.
- Different disciplines of study implied in the college, support the aspects of conducting researches with a big flexibility, because different areas of studies reach more applicable researches.
- Some of these researches are implemented in community and customer service.

2. *Weaknesses*

- Vanishing financial support to present the requirements of research conducting.
- Non availability of adequate research centers and suitable Labs to do researches.

3. *Opportunities*

- It is important to broaden opportunities of sending faculty members and scholars abroad through academic scholarships programs, (that is scholarships, fellowships and training developing courses).
- Opening new specialized researches centers.

4. Threats

- There is no enough time for the faculty member to conduct researches, because most of them are busy in fulfilling routine administrative responsibilities.
- Encouraging researchers publish their papers in solid scientific international journals.

Criterion 8 - Institutional Support

The financial support listed below covers the funding of all the college scientific departments. Al Khwarizmi College of engineering linked financially with University of Baghdad, which in turn linked with Ministry of Higher Education and Scientific Research. Financial allocations to Al Khwarizmi College of engineering are usually limited according to University of Baghdad budget.
The following tables show summary financial aspect of the Al Khwarizmi College of engineering for finical year 2011

A- The total of salaries and additional lectures

	Items relating to the financial aspect	Amount in ID
1	The total budget allocated to the College	4,322,380,267
2	Financial resources and funding sources that depend on them to cover the total annual expenditure	
	Sources of self-financing • Continuing education • Higher Education Fund (rents, and documents) • Private tunnel	 2,615,000 2,015,859 5,739,000
	Sources of donations and grants	No thing
	Other sources	No thing
3	Total salaries of teachers in the college	2,158,088,962
4	Total salaries of employees in the administrative and ancillary services	1,213,790,560
5	Total wages paid to the additional lectures	6,784,528

B- Infrastructures and equipment:

	Items	Amounts allocated	Amounts spent
1	Total amounts for the purposes of maintenance of buildings and machinery and equipment in the college.	78,637,500	77,133,000
2	Total amounts for the purposes of equipment, materials and supplies of the college.	588,536,796	576,651,450
3	Total amounts for the purchase of books and periodicals and references in the college.	15,600,000	15,600,500
4	Total amounts of conferences and seminars at the college.	600,000	510,750
5	The total amount for the training of faculty and staff in the administrative system in the college	908,400	869,000
6	Total amounts for the purposes and other expenses at the college such as: (Celebrations and science fairs, art, etc)	1,135,500	982,000
7	The total amount of the workshops at the college	10,510,500	10,504,000
8	The total amount of student services at the college	21,809,720	20,049,500
9	Total amounts for the purchase of textbooks at the college	2,912,000	2,851,000
11	The total amount of incentives and rewards in the college	2,100,000	2,040,000

The money allocated to the department is not enough, especially the department looking forward to:

1. Purchase of laboratory equipment and setup advanced laboratories.
2. Development of teaching aids.
3. Increase financial support for teachers to development and completion of scientific researches, publishing and attend conferences
4. Send faculty members to the advanced countries, participation in training courses in order to keep pace with scientific development in those countries.
5. Purchase of modern books and journals.