Annual Progress Report 2019-2020

Department of Electronics Engineering

University of Engineering & Technology, Taxila

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CHAPTER 1

DEPARTMENT OF ELECTRONICS ENGINEEING

1.1 Introduction

The Department of Electronics Engineering started in 2010 with an enrollment of 60 undergraduate students per year. The department is housed in the historic building of laboratory block. Laboratory block is the first building of this campus constructed in 1977. The building is renovated to accommodate Electronics Engineering Department. The department was shifted to 2nd floor of newly purpose built combined academic block beside administration block of UET Taxila in February, 2017. Current enrollment of the program is 50 undergraduate students per year.

The department offers undergraduate and postgraduate programs. In all matters regarding courses of study and others, the department follows the policies and guidelines of Higher Education Commission (HEC) and Pakistan Engineering Council (PEC). The all programs are recognized by HEC and PEC.

1.2 OBE Implementation

The Department started to work on Outcome Based Education (OBE) based system in 2015 by considering the guidelines given by PEC in its OBA manual. The Department is the pioneer for the implementation of OBE system at UET, Taxila. Currently, OBE system is functioning in its true sense under the following three committees:

- Program Committee
- Subject/CQI Committee
- Assessment/ Analysis Committee

1.3 Faculty Profile

Department of Electronics Engineering has the mixture of young and experienced faculty members.

Dean

Prof. Dr. Aftab Ahmad

Chairman

Prof. Dr. Yaseer Arafat Durrani

Professor

Prof. Dr. Yaseer Arafat Durrani
BSc. (Uni. of Peshawar)
BSc. Engg. (EMU, Turkey)
MSc. Engg. (KTH, Sweden)
PhD. Engg. (UPM, Spain)

Assistant Professors

Dr. Syed Azhar Ali Zaidi
BSc. Engg. (UET, Taxila)
MSc. Engg. (UET, Taxila)
PhD. (POLITO, Italy)

Engr. Khawaja Shafiq Haider
BSc Engg (DCET, Karachi)
MSc Engg (NUST, Islamabad)
Ph.D. Engg. (NUST, Islamabad)

Dr. Bilal Aslam
BSc. Eng. (UET, Taxila)
MSc Engg (NUST, Islamabad)
PhD. Engg. (UET, Taxila)

Dr. Aamir Rashid
BSc Engg (UET Lahore)
MSc Engg (Uni. of Nice, France)
Ph.D. Engg. (INPT, France)

Dr. Usman Masud
BSc. Engg. (UET, Taxila)
MSc. Engg. (Uni. of Kassel, Germany)
PhD. Engg. (Uni. of Kassel, Germany)

Lecturers

Adil Usman
BSc Engg (Air Univ, Islamabad)
MSc Engg (Air Univ, Islamabad)

Syed Zohaib Hassan Naqvi
BSc Engg (IIUI),
MSc Engg (IIUI)
MBA (VU)

Muhammad Atif Imtiaz
BSc Engg Engg (MAJU)
MSc Engg (UET, Taxila)

Muhammad Faraz (On Higher Studies Abroad)
BSc Engg (IIUI),
MSc Engg (UET, Taxila)

Qummar Zaman (On Higher Studies Abroad)
BSc Engg (IIUI)
MSc Engg (UET, Taxila)

Lab Engineers
Muhammad Umar Khan
BSc. Engg. (COMSATS, Abottabad)

Shujaat Hussain Shah
BSc. Engg. (UET, Taxila)

Hafiza Misbah Younis
BSc. Engg. (UET, Taxila)

Sumair Aziz
BSc. Engg. (IIU, Islamabad)

1.4 Summary of Initiatives to Adopt Outcome Based Assessment

The Department of Electronics Engineering started to work on Outcome Based System of Education in 2015 by considering guidelines given by PEC in its OBA manual. Following is the summary of activities done by the Department of Electronics Engineering, UET Taxila after the last PEC visit in 2018.

No.	Date	*Post PEC Visit 23-25th May 2018 Activities*
1.	26-10-2020	BoUGS meeting: Approval of Lab Rubrics & CLO Mapping with PLOs & Blooms taxonomy
2.	05-10-2020	Program Committee meeting: Finalized Lab Rubrics
3.	25-09-2020	CQI Committee meeting: Finalized Lab Rubrics
4.	24-09-2020	Academic Council meeting; Approval of revised curriculum 2020 onwards. PEO, Program Mission
5.	11-08-2020	Program Committee meeting: Mapping of 2K18 curriculum elective courses
6.	04-08-2020	Subject/CQI Committee online meeting: Mapping of Curriculum Elective courses for 2K18 onwards
7.	07-08-2020	Subject/CQI Committee online meeting: Finalized mapping of Curriculum Elective courses for 2K18 onwards
8.	03-02-2020	BoUGS meeting: Approval of revised curriculum 2020 onwards
9.	12-01-2020	IAB meeting: Approval of revised curriculum 2020 onwards
10.	26-11-2019	Subject/CQI Committee meeting: Spring-2019 Course Folders Evaluation
11.	9-12-2019	Program Committee meeting: Fall-2018 Course Folders Evaluation
12.	4-12-2019	Program Committee meeting: Mapping of 2K18 curriculum elective courses
13.	29-11-2019	Program Committee meeting: Fall-2018 Course folders evaluation
14.	12-10-2019	Assessment Committee meeting: Course/Lab folders-Fall-2019 PLO attainment sheets of 2K16, 2K17, 2K18,2K19
15.	18-10-2019	Assessment Committee meeting: Course/Lab folders-

		Spring-2019 PLO attainment sheets of 2K16, 2K17, 2K18,2K19
16.	25-07-2019	BoUGS meeting: Approval of Program Mission, PEOs, Approval of BSc undergraduate Curriculum 2K20 onwards
17.	18-07-2019	IAB meeting: Approval of Program Mission, PEOs, PLOs, Mapping of PEOs with Mission/Vision of institution, Evaluation process of PEOs, Mapping of PLOs with PEOs, revised curriculum
18.	15-04-2019	BoUGS meeting: Approval of Subject-wise mapping and Blooms taxonomy for 2K18 Curriculum onwards
19.	04-04-2019	Program Committee meeting: Subject-wise mapping and Blooms taxonomy for 2K18 Curriculum onwards
20.	04-04-2019	Subject/CQI Committee meeting: Subject-wise mapping and Blooms taxonomy for 2K18 Curriculum onwards
21.	22-04-2019	Program Committee meeting: Fall-2018 Course Folders Evaluation
22.	4-4-2019	Program Committee meeting: Curriculum 2K18 onwards evaluation
23.	06-12-2018	Subject/CQI Committee meeting: Spring-2018 Course Folders Evaluation
24.	22-10-2018	Subject/CQI Committee meeting: Students failed one or more PLOs
25.	14-05-2018	Subject/CQI Committee meeting: Fall-2017 Course Folders Evaluation
26.	05-10-2018	Program Committee meeting: Course/Lab folders-Spring-2018 PLO attainment sheets of 2K14, 2K15, 2K16
27.	16-05-2018	Program Committee meeting: KPIs for PEOs/PLOs/CLOs for CQI

1.5 Academic Program and Activities

With reference to the recommendations of the Departmental Industrial Advisory Board (IAB), Departmental Board of Undergraduate Studies (BoUGS), Board of Faculty (BoF) meetings, the following agenda items are approved in Academic Council meeting 42/2020 held on 24-09-2020:

1. Approval of Program Mission and Program Educational Objectives of Electronics Engineering Department, Main Campus.
2. Approval of BSc Undergraduate Revised Curriculum of Electronics Engineering Department, Main Campus.
3. Approval of MSc Postgraduate Revised Curriculum of Electronics Engineering Department Main Campus.
4. Approval of the PhD Postgraduate Revised Curriculum of Electronics Engineering Department Main Campus.

1.6 Program Mission

Provide quality education in Electronics Engineering imparting sound engineering knowledge and skills in order to fulfill the demands of industry and services sector.

1.7 Program Educational Objectives

The Electronics Engineering graduates should achieve the following objectives within five years of their graduation:

PEO-1: Proficiency in engineering knowledge and tools for the design, analysis and evaluation of complex engineering problems.

PEO-2: Enhance their knowledge and skills while providing effective solutions keeping in view the environmental and societal aspects.

PEO-3: Contribute as a team member or manager, demonstrating professionalism.

1.7 BSc Electronics Engineering Program Accreditation Status

Once the program started running smoothly and it was felt that the program fulfills the PEC accreditation requirements, the Department applied for accreditation of BSc Electronics Engineering for its first session of 2010 to Pakistan Engineering Council (PEC) in 2014. Consequently, said session was accredited by PEC. Since then, seven batches i.e., sessions 2010-2016 of Electronics Engineering are duly accredited by PEC. Table below outlines the history of accreditation of the BSc Electronics Engineering program. On 25-11-2020, the Self Assessment Report (SAR) has been submitted to PEC for Re-Accreditation Visit for 2K17 and onward sessions.

BSc Electronics Engineering Program Accreditation Status

Sr. No.	Session	Status	PEC Notification No.
1	2K10 Session (1st Session)	Accredited	PEC/AD/UET-T/CL-70/2014 Dated: 24-10-2014
2	2K11 & 2K12 Sessions (2nd and 3rd Sessions)	Accredited	PEC/AD/UET-T/DL-73(EAB)/2015 Dated: 20-08-2015
3	2K13 & 2K14 Sessions (4th and 5th Session)	Accredited	PEC/AD/UET-T/DL-83(OBA)/2017 Dated: 08-11-2017
4	2K15 & 2K16 (6th and 7th Sessions)	Accredited *under Level-II (OBA)*	PEC/AD/UET-T/DL-87(OBA)/2018 Dated: 17-08-2018
5	*2K17 and onward Sessions (8th Session onwards)*	*PEC Re-Accreditation Visit is held on 8-9 July, 2021and looking forward for the PEC decision.*	

1.8 Students Teacher Ratio

The following table lists the student teacher ratio.

Session	Current Strength
2K17	37
2K18	36
2K19	48
2K20	48
Total	169
Full-Time Dedicated Faculty (FTDF)	9
Shared Faulty	2 (4*0.5=2; 25% of FTDF = 2)
TAs/RAs	0 (9*0.5=4.5; 20% of FTDF = 2)
Student Teacher Ratio	169/(9+2)=15.36

1.9 Undergraduate Program

The Bachelor of Science in Electronics Engineering is a 4-year program. During the 4-year program the students are exposed to the core and elective courses of Electronics engineering, Basic humanities and social sciences, Computer sciences and Management sciences. The students are also required to complete a Final year project with a total of 6 credit hours. Students must complete list of approved courses with total 132-134 credit hours. The lab sessions are designed in order to enhance the concepts studied in the theoretical session and to explore the practical applications of the subject.

Years of study: 4 years

Minimum Number of Credit Hours: 132

1.9.1 Annual Intake

The following table gives the intake for all sessions of the program.

Sr. No	Intake Batch	Total Applicants	Total Admissions Offered	Total Students Admitted	Present Strength	No. of Section(s)
1	2K17	1791	47	46	37	1
2	2K18	4291	40	38	36	1
3	2K19	735	50	50	48	1
4	2K20	3575	50	48	48	1
Total			187	182	169	4

The majority of admitted students have passed Intermediate Examination with good marks. The merit for the 2K20-session is given in the following table.

Category	A (Open Merit)	S (Partial-Subsidized)	X (Overseas)
2K20 Merit No. of Seats	65.059 (22nd list)	52.671 (7th list)	49.800 (1st list)

1.9.2 Admission Response

As per record, 3575 applications were received last year for admission to BSc Electronics Engineering. Only 1.34% of the total candidates could secure admission in the degree course.

1.10 Final Year Project

Final Year Project (FYP) in the Department of Electronics Engineering (ENCD) is a two-semester, six (06) credits course. The evaluation of FYP is done through various components such as project proposal, presentations, report and project demo. In 7th semester the student is required to submit the project proposal and also to present his proposal and work in Mid-semester and End-semester presentations. In 8th semester the student required to submit the final project report and has to give an End semester presentation and the Oral examination of the Project. The evaluation of each component is done through rubrics. List of Final Year Projects (FYPs) of 2K16 and 2K17 is given in (Annex-I).

1.11 Internship

The Placement Office at UET Taxila search and develop contacts mainly with the national and multinational industries in public as well as in private sectors and R&D organizations with an aim to identify the prospective employers, jobs, scholarships and industrial training for university students. In order to accomplish the goal of University Placement Office, Department of Electronics Engineering has also constituted a Committee to contact with public and private sector companies to generate internship opportunities for its students. The industries in which students completed their internship in 2020 are as follows:

- PoF, Wah
- HIT, Taxila
- AWD, Islamabad
- Aeronautical Complex, Kamra
- IEE, Islamabad

1.11.1 Student Societies

The proposal for the construction of following two societies are requested to DSA:

- Electronics Dept. Literary Society
- Electronics Dept. Sports Society
- IEEE Consumer Electronics Society

Following Events/Workshops/Talks are organized by IEEE-CES of ENCD.

- Development of soft skills
- Engineering Knowledge for Children
- Commercialization of Projects
- Research Methodology
- CES Fiest

1.12 Student Industrial Trips

Due to COVID19, there were no industrial trips arranged during 2020-2021. However, following Industrial trips were arranged in 2019-20:

- Microtech. Ltd., Lahore (2K15, 2K16 Sessions)
- Packages, Lahore (2K15 Session)
- National Institute of Electronics, Islamabad (2K16, 2K17 Sessions)

1.13 Postgraduate Program

The Department was mandated by the University to start its postgraduate program in 2014. At present, it has an academic staff of 15, including 11 faculty members, involved in postgraduate teaching and research work. Under this program, the following degrees will be offered:

- Master of Science in Electronics Engineering
- Doctor of Philosophy in Electronics Engineering

The Department offers both MSc. and PhD. postgraduate programs recognized by the HEC with the following specializations:

i. Electronics System Design
ii. Microelectronic Materials and Devices
iii. Biomedical Electronics

The courses contain a balance of professional as well as research aspects and are designed to cater the needs of fresh graduates pursuing career development in both industry and research domains. The faculty of Electronics Engineering Department is highly qualified and holds diverse research interests in the above mentioned areas. In addition to their academic responsibilities, the faculty is actively involved in conducting quality research in their respective areas of investigation.

1.13.1 Enrollment – 2019-20

-	Applications	Entry Test	Interview	Merit List	Registered
MS-Fall-2019	41	35	27	27	10
MS-Fall-2020	6	3	3	3	2
PhD-Fall-2019	6	5	5	5	5
PhD-Fall-2020	2	1	1	1	1

1.13.2 Post graduate Students Strength

MSc. Program							
Session	Enrolled	FT	PT	Course Work	Thesis	Dropped	Completed
MS-15	15	0	15	0	2	13	0
MS-17	23	15	8	6	14	3	0
MS-18	12	4	8	12	0	0	0
MS-19	10	0	10	10	0	0	0
MS-20	2	0	2	2	0	0	0

PhD Program						
Session	Enrolled	FT	PT	Course Work	Comprehensive	Thesis
PhD-14	3	0	3	0	1	2
PhD-15	3	0	3	0	1	2
PhD-17	1	0	1	1	0	0
PhD-18	2	0	2	2	0	0
PhD-19	5	0	5	5	0	0
PhD-20	1	0	1	1	0	0

1.13.3 Courses Offered

The courses offered in Spring-2018 and Fall-2018 semesters are listed in Table I to IV.

Table-I Courses Offered in MSc Fall-2019 Semester in Electronics Engineering					
Sr No.	Course Code	Course Name	Teacher Name	Specialization	Type
1	EN-5001	Mathematical Methods for	Dr. Yaseer Arafat	All	Core
2	EN-5002	Random Processes	Dr. Aamir Rashid	All	Core
3	EN-5105	FPGA-based Design	Dr. Syed Azhar Ali Zaidi	Electronic System Design	Elective
4	EN-5204	Optoelectronic Devices	Dr. Usman Masud	Semiconductor Materials, Devices and Design	Elective
5	EN-5109	Integrated Circuit Design	Dr. Shabbir	Electronic System Design	Elective
6	EN-5110	System on chip Testing and	Prof.Dr. Iram Baig	Electronic System Design	Elective

Table-II Courses Offered in PhD Fall-2019 Semester in Electronics Engineering				
S.No.	Course Code	Course Name	Teacher Name	Type
1	EN-6001	Advanced Engineering Mathematics	Dr. Yaseer Arafat Durrani	Core
2	EN-6002	Random Processes and Statistics	Dr. Aamir Rashid	Core
3	EN-6003	Numerical Analysis	Dr. Khawaja Shafique Haider	Core
4	EN-6306	Optoelectronic Devices	Dr. Usman Masud	Elective
5	EN-6309	IC Fabrication Processes	Dr. Yaseer Arafat Durrani	Elective
6	EN-6310	Special Topics in Electronics System	Dr. Aamir Rashid	Elective

Table-III Courses Offered in MSc Spring-2019 Semester in Electronics Engineering				
Sr No.	Course Code	Course Name	Teacher Name	Type
1	EN-5101	Advanced VLSI	Dr. Yaseer Arafat	Electronic System
2	EN-5002	Random	Dr. Aamir Rashid	All
3	EN-5105	FPGA based	Dr.Syed Azhar Ali	Electronic System
4	EN5107	Microprocessor-based System	Dr. Shafiq Haider	Electronic System Design
5	EN-5110	System-on-Chip Testing and Verification	Dr. Yaseer Arafat Durrani	Electronic System Design

Table-IV Courses Offered in PhD Spring-2019 Semester in Electronics Engineering				
Sr No.	Course Code	Course Name	Teacher Name	Type
1	EN-6002	Random Processes & Statistics	Dr. Aamir Rashid	Core Course
2	EN-6304	MEMS Design & Micro-machining	Dr. Usman Masud	Elective Course
3	EN-6310	Special Topics in Electronics System	Dr. Yaseer Arafat Durrani	Elective Course

Table-V Courses Offered in MSc Fall-2020 for Session-2019					
Sr. No	Course Code	Course Name	Teacher Name	Teacher	Specialization
1	EN-5101	Advanced VLSI Design	Dr. Yaseer Arafat Durrani	Internal	Electronic System Design
2	EN-5109	Integrated Circuit Design	Dr. Yaseer Arafat Durrani	Electrical	Electronic System Design
3	EN-5302	Modeling And Simulation of Physiological System	Dr. Khawaja Shafiq Haider	Internal	Electronic System Design
4	EN-5002	Random Processes	Dr. Obaidullah	Electrical	Electronic System Design
5	EN-5105	FPGA- Based Design	Dr. Azhar Ali Zaidi	Internal	Electronic System Design
6	EN-5107	Micro-Processor Based Design	Dr. Irum Baig	Electrical	Electronic System Design
7	EN-5001	Mathematical Methods for Engineers and Scientists	Dr. Amir Rashid	Internal	Electronic System Design

Table-VI Courses Offered in PhD Fall-2020 Semester for Session-2019					
Sr No	Course Code	Course Name	Teacher Name	Teacher	Specialization
1	EN-6001	Advanced Engineering Mathematics	Dr. Amir Rashid	Internal	Electronic System Design
2	EN-6002	Random Processes and Statistics	Dr. Obaidullah	Electrical	Electronic System Design
3	EN-6107	Automation Theory	Dr. Khawaja Shafiq Haider	Internal	Electronic System Design

Table-V Courses Offered in MSc Fall-2020 Semester for Session-2020					
Sr No	Course Code	Course Name	Teacher Name	Teacher	Specialization
1	EN-6101	Advanced VLSI Design	Dr. Yaseer Arafat Durrani	Internal	Electronic System Design

2	EN-6003	Linear system theory	Dr. Khawaja Shafiq Haider	Internal	Electronic System Design
3	EN-6106	FPGA- Based System Design	Dr. Azhar Ali Zaidi	Internal	Electronic System Design
4	EN-6001	Mathematical Methods For Engineers and Scientists	Dr. Amir Rashid	Internal	Electronic System Design

Table-VI Courses Offered in PhD Fall-2020 Semester for Session-2020					
Sr No	Course Code	Course Name	Teacher Name	Teacher	Specialization
1	EN-7101	Advanced VLSI System Design	Dr. Yaseer Arafat Durrani	Internal	Electronic System Design
2	EN-7106	Advanced FPGA- Based System Design	Dr. Azhar Ali Zaidi	Internal	Electronic System Design
3	EN-7003	Advanced Linear System Theory	Dr. Khawaja Shafiq Haider	Internal	Electronic System Design
4	EN-7001	Advanced Engineering Mathematics	Dr. Aamir Rasheed	Internal	Electronic System Design

Table-VI Courses Offered in MSc Spring-2020 Semester					
Sr. No.	Course	Course Name	Teacher's Name	Specialization	Course Type
01	EN-5101	Advanced VLSI Design	Dr. Yaseer Arafat	Electronics System Design	Elective
02	EN-5004	Electromagnetic Field Theory	Dr. Aamir Rashid	All	Core
03	EN-5302	Modelling and Simulation of	Dr. Shafiq Haider	Electronics System Design	Elective
04	EN-5104	System-on-Chip Design	Dr. Syed Azhar Ali	Electronics System Design	Elective

Table-VI Courses Offered in PhD Spring-2020 Semester					
Sr No.	Course No.	Course Name	Teacher Name	Type	Classroom
1	EN-6309	IC Fabrication Processes Design	Dr. Yaseer Arafat Durrani	Elective	05-ENCD
2	EN-6101	Large Scale Systems and Control	Dr. Shafiq Haider	Elective	05-ENCD
3	EN-6310	Special Topics in Electronics System Design	Dr. Syed Azhar Ali Zaidi	Elective	05-ENCD

1.13.4 Meeting of Board of Postgraduate Studies

Sr. No	Meeting No.	Date
01	1/2019	25-07-2019
02	2/2019	19-12-2019
03	3/2019	19-12-2019
04	1/2020	04-09-2020
05	2/2020	22-10-2020

CHAPTER 2

RESEARCH AND DEVELOPMENT

2.1 Overview

The ENCD Department was established in 2010 to fulfill the needs of the country by producing responsible graduates equipped with sound knowledge and skills along with highest professional and ethical values through conducive learning environment. The Department offers four years Undergraduate Degree Program leading to BSc. in Electronics Engineering. The Department also offers Postgraduate Degree Program leading to MSc and PhD in Electronics Engineering. The Department is located on the 2nd Floor of newly constructed Combined Academic Block.

2.2 Current Enrolment

PhD. Engg 12
MSc. Engg 38
BSc. Engg 175

2.3 Building Area

27,155 sq. ft.

2.4 Laboratories

Lab is an integrated part of most of the theory courses. The laboratories in the Department have state-of-the-art equipment to fulfill the needs of the modern engineering education. The lab sessions are designed to enhance the concepts studied in the theoretical courses, to gain hands-on experience in design and debugging and to explore various practical engineering applications. The Electronics Engineering Department has following state-of-the-art laboratories:

I. Basic Electronics Lab
II. Digital Electronics Lab
III. VLSI Design Lab
IV. Embedded Systems Lab
V. Instrumentation and Control Lab
VI. Digital Signal Processing & Communication Lab
VII. Computer Simulation Lab
VIII. Project Lab

2.5 Post Graduate Studies

The Department was mandated by the University to start its postgraduate program in 2014. At present, it has an academic staff of 15, including 10 faculty members, involved in postgraduate teaching and research work. The Department offers both MSc. and PhD. postgraduate programs recognized by the HEC with the following specializations:

iv. Electronics System Design
v. Semiconductor Materials, Devices and Design
vi. Bio-Electronics

The courses contain a balance of professional as well as research aspects and are designed to cater the needs of fresh graduates pursuing career development in both industry and research domains. The faculty of Electronic Engineering Department is highly qualified and holds diverse research interests in the above mentioned areas. In addition to their academic responsibilities, the faculty is actively involved in conducting quality research in their respective areas of investigation.

2.6 Research Facilities and Groups:

Research training is core part of our graduate program. All Postgraduate students are required to complete research thesis culminating in research publication in high-impact factor journals. To facilitate in their research activities, all Postgraduate students are provided with dedicated state-of-the-art computers, high-speed internet access, subscriptions to many quality journal publications as well as full-time access to research labs. At present the department has three main research groups active in the following key areas:

1. Electronics System Design Research Group:

This group is working in areas such as VLSI Design, FPGA-based Design and Mixed signal Design. The following faculty members are part of this research group:

- Dr Yaseer Arafat Durrani
- Dr. Azhar Ali Zaidi
- Engr. Qummar Zaman

2. Electromagnetics and Optics Research Group:

This group is working primarily in areas such as Electromagnetic Field Theory, Laser and Fiber Optics Design and Metamaterials. The following faculty members are part of this research group:

- Dr. Aamir Rashid
- Dr. Usman Masud
- Engr. Muhammad Faraz
- Engr. Syed Zohaib Hassan Naqvi

3. Control & Automation Research Group:

This group is working on analysis and design of Control & Automation related research activities. The following faculty members are part of this research group:

- Dr. Khawaja Shafiq Haider
- Engr. Adil Usman
- Engr. Muhammad Atif Imtiaz

2.7 Publications

The faculty members are actively involved in research. 13 journal papers are published in 2017-18. Details are given in (Annex-II).

2.8 Workshop/ Seminar/Conferences

- Engr. Zohaib Hasan Naqvi participated in international conference in Jordan.
- Dr. Usman Masud participated in international conference in USA.
- Dr. Usman Masud participated in two international Conferences in Pakistan.

CHAPTER 3

FACULTY DEVELOPMENT

3.1 Faculty Development Programs

The faculty members avail different scholarships offered by HEC and International Universities for MS/PhD. Paid leave can be avail by the Faculty member for higher studies after 3 years of service as per University rules.

The following faculty members of the department are on higher studies abroad:

Sr. No	Name	Designation	Country
1	Engr. Muhammad Fraz	Lecturer	Korea
2	Engr. Qummar Zaman	Lecturer	Germany

3.2 Faculty Training for OBE

Faculty members of Electronic Engineering department participated in various seminars and workshops for OBE implementation. Details are listed in the following table.

Agenda	Attendee(s)	Date and Venue
"Training Workshop on OBE/OBA System" by Ir. Prof. Azlan bin Abdul Aziz, Malaysia	Dr. Usman Masood Dr. Sajjad Hussain Engr. Adil Usman	Electronics Engineering Department, UET Taxila 6-7 February, 2018
Training Session on OBE System	Faculty members of Electronic Engineering department.	Electronic Engineering Department, UET Taxila 1st February, 2018.

CHAPTER 4

STRENGTH OF INFRASTRUCTURE & NEW INITIATIVES

4.1 Classrooms

Currently there are 6 class rooms and 1 lecture theatre. All classrooms have been upgraded with two white boards, multimedia and other facilities. Request for the up gradation of Lecture Theatre is submitted for the approval.

4.2 Undergraduate Labs

Recently, following 9 state-of-art labs have been established and upgraded:

- Computer Lab-1
- Computer Lab-2
- Basic Electronics Lab
- Digital Electronics Lab
- VLSI Design Lab
- Microprocessor & Microcontroller Lab
- Instrumentation & Control Lab
- DSP & Communication Lab
- Project Lab

New furniture for different labs has been purchased with the amount of Rs.0.6 million.

4.3 Postgraduate Lab

The PC-1 for the postgraduate lab is currently in process.

4.4 Departmental Library

The Departmental Library has been established with 120 books.

4.5 Plantation

The department is decorated with more than 40 plants.

4.6 Upgradation of Computers

There are total 137 computers in the department. Among them 121 computers for students use and 16 for faculty and staff members. Existing computers are upgraded, while core i7 computers have been purchased for the up gradation of different labs.

4.7 Girls Student Common Room

For girls, separate common rooms is provided for their extra-curricular activities. The request for indoor Table-Tennis and other indoor activities are submitted for approval.

(Prof. Dr. Yaseer Arafat Durrani)
Chairman ENCD

ANNEXURE-1

LIST OF FINAL YEAR PROJECTS

Final Year Project List for Session-2K17				
Sr.#	Reg. Nos	Names	Project Title	Supervisor
1.	17-ENC-11 17-ENC-01	Abdullah Mazhar Naheel Rizvi	Design of 256MB DDR SRAM memory using Hardware Descriptive language	Dr. Yaseer A. Durrani
2.	17-ENC-20 17-ENC-48	Muhammad Adnan Zurria Sajid	Design a Robot Model for Surgical Assistance	Dr. Yaseer A. Durrani
3.	17-ENC-04 17-ENC-14	Hamza Tariq Hamza Aziz	An FPGA based SoC design for an Autonomous Robot	Dr. Azhar Ali Zaidi
4.	17-ENC-32 17-ENC-29	Abdullah Mustafa Hayat	Design and Implementation of a FPGA based autonomous car	Dr. Azhar Ali Zaidi
5.	17-ENC-34 17-ENC-06	Awais Zulafqar Eamin Chaudhary	Design of a Smart Irrigation Solution	Dr. Aamir Rashid
6.	17-ENC-28 17-ENC-26	Sonia Kiran Fahad Ali Khan	Design of Control System for an Electric Vehicle Motor (Dr	Dr. Aamir Rashid
7.	17-ENC-19 17-ENC-12	Nadeem Asghar Ghulam Rasool	Design of a Low-Cost Mechanical Ventilator System.	Dr. Aamir Rashid
8.	17-ENC-47 17-ENC-25	M Fezan-ul-Islam Ghulam Abbas	Smart Assistance System for the Visually Impaired	Dr. Usman Masud
9.	17-ENC-46 17-ENC-07	Bilal Altaf Ali Hamza	Multipurpose Agribot	Dr. Usman Masud
10.	17-ENC-41 17-ENC-52	Arslan Riasat Imran Niazi	Controller Design for a Control System	Dr. Khawaja Shafiq Haider
11.	17-ENC-27 17-ENC-13	Muhammad Furqan Syed Zubair Zahid	PLC-based Automation of a Process	Dr. Khawaja Shafiq Haider
12.	17-ENC-31 17-ENC-08	Hira Shaukat Awais Abbas	Model Order Reduction of Large-Scale Systems	Dr. Khawaja Shafiq Haider
13.	17-ENC-49 17-ENC-18	Usama Gulzar Muhammad Zeeshan	Power controller design for electric bike	Engr. Adil Usman
14.	17-ENC-38 17-ENC-16	Ahmad Zahoor Muhammad Ahmad	Multi-sensor signal data fusion using a machine learning technique for motor fault detection	Engr. Adil Usman
15.	17-ENC-36 17-ENC-09	Asra Malik Ateeqa Sajjad	Design and Implementation of Brain Computer Interface for Electric Wheel Chairs with EEG and Eye-blinking Signals	Engr. M. Atif Imtiaz
16.	17-ENC-39 17-ENC-17	Taimoor Aslam Mehran Ali	Assistive Navigation System design for Vision Impairers	Engr. M. Atif Imtiaz
17.	17-ENC-50 17-ENC-40	Abdul Rehman Zain Tariq	Diagnostic System for Pulmonary Abnormalities	Engr. Zohaib Hassan

Final Year Project List for Session-2K16				
Sr.#	Reg Nos	Names	Adviser	Project
1	16-ENC-02 16-ENC-10	Fatima Sagheer Samra Imran	Dr. Yaseer Arafat Durrani	Design Of 2D Automotive Sketching Machine from Hand Made Drawing
2	16-ENC-25 16-ENC-26	Hafiz Umer Amjad Ahmad Mujtaba	Dr. Yaseer Arafat Durrani	Upgradation of Distribution Mechanism of Test-Bench
3	16-ENC-15 16-ENC-30	Hammad Raza Hamza Ibrar	Dr. Azhar Ali Zaidi	Hardware Implementation of Deep CNN on FPGA
4	16-ENC-18 16-ENC-20	Hammad Tariq Sikander Zaheer	Dr. Azhar Ali Zaidi	Navigational System for Unmanned Aerial Vehicle Using Embedded System
5	16-ENC-54 16-ENC-56	M. Tariq Shaheen M. Bilal	Dr. Aamir Rashid	Implementation of Feed Forward Neural Network on FPGA using Layer Multiplexing
6	16-ENC-11 16-ENC-52	Ghulam Nabi M. Zeeshan	Dr. Aamir Rashid	Self Driving Robotic Car using Artificial Neural Network
7	16-ENC-22 16-ENC-32	M. Abbas Hassan Ali Hashmi	Dr. Shafiq Haider	PLC based Automation of a Boiler Process
8	16-ENC-14 16-ENC-48	Ahsan Mehmood Rizwan Habib	Dr. Shafiq Haider	2 DoF Position Control of an inverted Pendulum
9	16-ENC-01 16-ENC-35	Amber Shahjehan Javeria Mumtaz	Dr. Usman Masud	Animatronics Robot Model System
10	16-ENC-05 16-ENC-41	Zohaib Mushtaq Anfaal Tariq	Dr. Usman Masud	Real-Time Vehicle Classification using Image Processing
11	16-ENC-12 16-ENC-43	M. Bilal Aamir Ehtisham Ejaz	Dr. Usman Masud	Real-Time Pedestrian Tracking
12	16-ENC-28 16-ENC-36	Fatima Amjad Maheen Shakeel	Engr. Zohaib Hassan	Embedded System Design for Effective Translation of Sign Language between Disabled and Normal People
13	16R/15-ENC-20 16R/15-ENC-18	Hafiz M. Rizwan Hassan Javed	Engr. Zohaib Hassan	6KVA Solar System with Solar Tracking
14	16-ENC-46 16-ENC-47	Ali Haider Fatima Ali	Engr. Zohaib Hassan	Fuzzy Logic based Smart Home Energy Management System
15	16-ENC-39 16-ENC-23	Ahmad Zaib Aiman Maqsood	Engr. Atif Imtiaz	Wearable Scene Classification System for visually impaired
16	16-ENC-37 16-ENC-31	Hamza Ali Muhammad Ali	Engr. Atif Imtiaz	Solar Design and Implementation for Robot Farming Application
17	16-ENC-19 16-ENC-51 16-ENC-42	M. Umair Khalid Sinan Ali Khunsa Amjad	Engr. Atif Imtiaz	500W Dynamic Wind Turbine
18	16-ENC-34 16-ENC-40	Bilal Hafeez Shahid Mehmood	Engr. Adil Usman	2KW Intelligent Solar System
19	16-ENC-13 16-ENC-24	M. Saad M. Adnan Qasim	Engr. Adil Usman	Autonomous Welding Robot

ANNEXURE 2

List of Publications (2018-2020)

1. F. Siddique, Yaseer A. Durrani "Efficient power modeling approach for IP based SoC system using discrete water cycle algorithm" Turkish Journal of Electrical Engineering & Computer Sciences, ISSN: 1300-0632, E-ISSN: 1303-6203, 2020
2. Yaseer A. Durrani "Power Analysis Approach for NoC-based Homogeneous Stacked 3D ICs" World Scientific Journal of Circuits, Systems and Computers, Print ISSN: 0218-1266, Online ISSN: 1793-6454, https://doi.org/10.1142/S0218126618500342, 2018
3. Yaseer A. Durrani "Power and Thermal Modeling Approach for Homogeneously Stacked Butterfly Fat Tree Architecture in 3D ICs" Wiley International Journal of Numerical Modeling, Electronic Networks, Devices & Fields, Vol. 31, no. 1, DOI:10.1002/jnm.2330, ISSN: 1099-1204, 2018
4. K. Mahmood, A. Rafique, Yaseer A. Durrani, "Effect of Isothermal Treatment on Ni3Al coatings Deposited by Air Plasma Spraying System" Archives of Metallurgy and Materials, ISSN: 1733-3490, 2018
5. Qammar Zama, S. Alraho, A. Konig, "Low-cost Indirect Measurement Methods for Self-x Integrated Sensory Electronics for Industry" De Gruyter Oldenbourg, Technisches Messen 2020, 87(S1): S79-S84
6. Haider, Shafiq, et al. "Frequency interval gramians based structure preserving model order reduction for second order systems."Asian Journal of Control" (2018): 790-801.
7. Haider, Khawaja Shafiq, et al. "Frequency limited Gramians-based structure preserving model order reduction for discrete time second-order systems."International Journal of Control" (2019): 2608-2619.
8. Haider, Shafiq, et al. "Time-limited Gramians-based model order reduction for second-order form systems "Transactions of the Institute of Measurement and Control 41.8 (2019): 2310-2318.
9. M. Awais, A. Ahmed, S. A. Ali, M. Naeem, W. Ejaz and A. Anpalagan, "Resource Management in Multicloud IoT Radio Access Network," in *IEEE Internet of Things Journal*, vol. 6, no. 2, pp. 3014-3023, April 2019, doi: 10.1109/JIOT.2018.2878511.
10. Tariqullah, Aamir Rashid, "Angularly Stable and Broadband Chiral Metamaterial Based Design for Asymmetric Transmission of Linearly Polarized Waves", Microwave and Optical Technology Letters (MOTL) (Accepted July 2020).
11. Saba Arshad, Farooq A. Tahir, Aamir Rashid, M. M. Saad Missen & James A. Flint (2020), "Coplanar-waveguide fed Circularly Polarized Antenna for Wireless WLAN/LTE Applications, Electromagnetics, DOI: 10.1080/02726343.2020.1780379
12. Ejaz, F., Hamayun, M. T., Hussain, S., Ijaz, S., Yang, S., Shehzad, N., & Rashid, A. (2019). An adaptive sliding mode actuator fault tolerant control scheme for octorotor system. International Journal of Advanced Robotic Systems. Volume 16, issue 2, March 2019.
13. Qaisar Bashir, Muhammad Naeem Shehzad, Aamir Rashid et al, "An online temperature-aware scheduling technique to avoid thermal emergencies in multiprocessor systems", Elsevier journal of Computers & Electrical Eng., Volume 70, August 2018, Pages 83-98.
14. Mudassar Murtaza, Aamir Rashid et al. "An Angularly Stable Broadband Cross-Polarization Conversion Metasurface", EuCAP (2019), pp. 1-3.
15. Usman et al "Atomization analysis of the extremely sensitive laser-based dual mode biomedical sensor", Lasers in medical science,2019

16. Usman et al “Investigation of cauty length and more spacing effects in dual mode sensor” IEEE sensors, 2018
17. Usman et al, “Design of Logestics Air Vehicle (LAV) to avoid real-time obstacles in logestics and biomedics” 3rd ICETEMS 2018
18. S. Z. H. Naqvi, M. A. Choudhry, A. Z. Khan and M. Shakeel, "Intelligent System for Classification of Pulmonary Diseases from Lung Sound," 2019 13th International Conference on Mathematics, Actuarial Science, Computer Science and Statistics (MACS), Karachi, Pakistan, 2019, pp. 1-6, doi: 10.1109/MACS48846.2019.9024831.
19. M. A. Imtiaz, M. Naveed, N. Bibi, S. Aziz and S. Z. H. Naqvi, "Control System Design, Analysis & Implementation of Two Wheeled Self Balancing Robot (TWSBR)," *2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON)*, Vancouver, BC, 2018, pp. 431-437, doi: 10.1109/IEMCON.2018.8614858.
20. S. Aziz, S. Z. Hassan Naqvi, M. U. Khan and T. Aslam, "Electricity Theft Detection using Empirical Mode Decomposition and K-Nearest Neighbors," 2020 International Conference on Emerging Trends in Smart Technologies (ICETST), Karachi, Pakistan, 2020, pp. 1-5, doi: 10.1109/ICETST49965.2020.9080727.
21. S. Z. Hassan Naqvi, S. Aziz, M. U. Khan, N. Asghar and G. Rasool, "Emotion Recognition System using Pulse Plethysmograph," 2020 International Conference on Emerging Trends in Smart Technologies (ICETST), Karachi, Pakistan, 2020, pp. 1-6, doi: 10.1109/ICETST49965.2020.9080725.
22. M. U. Khan, S. Aziz, S. Z. Hassan Naqvi, A. Zaib and A. Maqsood, "Pattern Analysis Towards Human Verification using Photoplethysmograph Signals," 2020 International Conference on Emerging Trends in Smart Technologies (ICETST), Karachi, Pakistan, 2020, pp. 1-6, doi: 10.1109/ICETST49965.2020.9080751.
23. M. U. Khan, S. Aziz, S. Z. Hassan Naqvi and A. Rehman, "Classification of Coronary Artery Diseases using Electrocardiogram Signals," 2020 International Conference on Emerging Trends in Smart Technologies (ICETST), Karachi, Pakistan, 2020, pp. 1-5, doi: 10.1109/ICETST49965.2020.9080694.
24. M. U. Khan, S. Aziz, M. Sohail, S. Z. Hassan Naqvi, S. Samer and Z. Sajid, "Detection of Subacute Intestinal Obstruction from Surface Electromyography Signatures," 2020 International Conference on Emerging Trends in Smart Technologies (ICETST), Karachi, Pakistan, 2020, pp. 1-6, doi: 10.1109/ICETST49965.2020.9080710.
25. Sumair Aziz., Khan, M.U., Alhaisoni, M., Akram, T. and Altaf, M., 2020. Phonocardiogram Signal Processing for Automatic Diagnosis of Congenital Heart Disorders through Fusion of Temporal and Cepstral Features. Sensors, 20(13), p.3790. (IF: 3.27)
26. Sumair Aziz., Awais, M., Akram, T., Khan, U., Alhussein, M. and Aurangzeb, K., 2019. Automatic scene recognition through acoustic classification for behavioral robotics. Electronics, 8(5), p.483. (IF: 2.41)
27. Ali, H., Adnan, S.M., Sumair Aziz., Ahmad, W. and Obaidullah, M., 2019. Sound Classification of Parkinsonism for Telediagnosis. Technical Journal, 24(01), pp.90-97.
28. Adnan, S.M., Irtaza, A., Sumair Aziz., Ullah, M.O., Javed, A. and Mahmood, M.T., 2018. Fall detection through acoustic local ternary patterns. Applied Acoustics, 140, pp.296-300. (IF: 2.44)
29. ud Din, Z., Adnan, S.M., Ahmad, R.W., Sumair Aziz., Ismail, W. and Iqbal, J., 2018. Classification of Tomato Plants’ Leaf Diseases Using Image Segmentation and SVM. Technical Journal, 23(02), pp.81-88.
30. Shah, S.A., Malik, A., Sumair Aziz. and Ahmad, W., 2018. Sound Recognition Aimed towards Hearing Impaired Individuals in Urban Environment using

Ensemble Methods. Journal of Information Communication Technologies and Robotic Applications, pp.30-39.
31. Aziz, S., Hayat, M.M., Naqvi, S.Z.H., Furqan, M., Khan, M.U. and Zahid, M.Z., 2020, June. Electrocardiography based Biometric Verification System. In 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE) (pp. 1-5). IEEE.
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33. Khan, M.U., Aziz, S., Ch, J.M., Shahjehan, A., Imtiaz, A. and Waseem, A., 2020, June. Detection of Acute Coronary Syndrome using Electrocardiogram Signal Analysis. In 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE) (pp. 1-6). IEEE.
34. Khan, M.U., Amjad, F., Aziz, S., Naqvi, S.Z.H., Shakeel, M. and Imtiaz, M.A., 2020, June. Surface Electromyography based Pakistani Sign Language Interpreter. In 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE) (pp. 1-5). IEEE.
35. Naqvi, S.Z.H., Aziz, S., Khan, M.U., Abbas, M., Haider, A. and Hashmi, H.A., 2020, June. Electrocardiography based System for Characterization of Diabetes. In 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE) (pp. 1-6). IEEE.
36. Aziz, S., Ibraheem, S., Malik, A., Aamir, F., Khan, M.U. and Shehzad, U., 2020, June. Electrooculugram based Communication System for People with Locked-in-Syndrome. In 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE) (pp. 1-6). IEEE.
37. Khan, M.U., Saad, M., Aziz, S., Ch, J.M., Naqvi, S.Z.H. and Qasim, M.A., 2020, June. Electrocardiogram based Gender Classification. In 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE) (pp. 1-6). IEEE.
38. Naqvi, S.Z.H., Arooj, M., Aziz, S., Khan, M.U. and Choudhary, M.A., 2020, June. Spectral Analysis of Lungs sounds for Classification of Asthma and Pneumonia Wheezing. In2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE) (pp. 1-6). IEEE.
39. M. A. Imtiaz, S. Aziz, A. Zaib, A. Maqsood, M. U. Khan and A. Waseem, "Wearable Scene Classification System for Visually Impaired Individuals,"2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE), Istanbul, Turkey, 2020, pp. 1-6, doi: 10.1109/ICECCE49384.2020.9179439.
40. M. U. Khan, S. Aziz, J. M. Ch., A. Shahjehan, M. A. Imtiaz and A. Waseem, "Detection of Acute Coronary Syndrome using Electrocardiogram Signal Analysis,"2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE), Istanbul, Turkey, 2020, pp. 1-6, doi:10.1109/ICECCE49384.2020.9179337.
41. S. Aziz, M. Ahmed, S. Z. H. Naqvi, M. U. Khan, M. A. Imtiaz and A. Waseem, "Machine Bearing Fault Diagnosis System using Tri-Axial Accelerometer," 2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE), Istanbul, Turkey, 2020, pp. 1-6, doi: 10.1109/ICECCE49384.2020.9179326.
42. M. U. Khan, Z. A. Choudry, S. Aziz, S. Z. H. Naqvi, A. Aymin and M. A. Imtiaz, "Biometric Authentication based on EMG Signals of Speech,"2020 International Conference on Electrical, Communication, and Computer Engineering (ICECCE), Istanbul, Turkey, 2020, pp. 1-5, doi: 10.1109/ICECCE49384.2020.9179354.
43. M. U. Khan, S. Aziz, A. Malik and M. A. Imtiaz, "Detection of Myocardial

Infarction using Pulse Plethysmograph Signals,"2019 International Conference on Frontiers of Information Technology (FIT), Islamabad, Pakistan, 2019, pp. 95-955, doi: 10.1109/FIT47737.2019.00027.

44. M. U. Khan, M. A. Imtiaz, S. Aziz, Z. Kareem, A. Waseem and M. A. Akram, "System Design for Early Fault Diagnosis of Machines using Vibration Features,"2019 International Conference on Power Generation Systems and Renewable Energy Technologies (PGSRET), Istanbul, Turkey, 2019, pp. 1-6, doi: 10.1109/PGSRET.2019.8882726.
45. M. A. Imtiaz, M. Naveed, N. Bibi, S. Aziz and S. Z. H. Naqvi, "Control System Design, Analysis & Implementation of Two Wheeled Self Balancing Robot (TWSBR),"2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Vancouver, BC, 2018, pp. 431-437, doi: 10.1109/IEMCON.2018.8614858
46. S. Aziz, Z. Kareem, M. U. Khan and M. A. Imtiaz, "Embedded System Design for Visual Scene Classification,"2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Vancouver, BC, 2018, pp. 739-743, doi: 10.1109/IEMCON.2018.8614864.