SELF ASSESSMENT REPORT

B.S Electrical Engineering

FAST School of Engineering

NATIONAL UNIVERSITY

of Computer & Emerging Sciences

UNIVERSITY CAMPUS, ISLAMABAD

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Prepared by: Program Team, FAST School of Engineering

Edited by: Dr. Waseem Ikram , Dean Faculty of Engineering

Reviewed by: Quality Enhancement Cell

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Introduction

Quality Enhancement Cell (QEC) of the National University of Computer & Emerging Sciences (NUCES) is committed to facilitate in uplifting the quality standards of education. Preparation of "Self Assessment Report" of BS Electrical Engineering is a step towards this objective. The report is prepared by BS Electrical Engineering Program Team (Dr. Muhammad Saeed and Engr. Adnan Saeed), edited by Dr. Waseem Ikram, Dean Faculty of Engineering, and duly reviewed by QEC for its conformance with the prescribed format. It provides the information about practices in BS Electrical Engineering Program against HEC Self Assessment criteria. The report has been supported by various pertinent evidences e.g. Summary of employers survey, alumni survey, graduating survey, course evaluation, teachers' evaluation report, faculty resume, lab assessment report etc.

Assessment Team comprising of subject specialists will be invited to take the self assessment process towards completion for continuous improvements. Rubric report will be prepared for designing implementation plans to take corrective actions by concerned bodies.

Criteria 1

Mission, Vision, and Objectives

Criteria 1: Program Mission, Objectives and Outcomes

Standard 1.1 The program must have documented measurable objectives that support institution mission statements.

Following is the mission of FAST School of Engineering and BS Electrical Engineering Program:

> *To provide graduates with a strong and stable foundation in the traditional and contemporary areas of electrical engineering. The graduates of this program are able to conceive, formulate and effectively communicate solutions to technological problems in society. They are responsible and productive members of the society upholding high moral standards having an aptitude and attitude towards the betterment of the society through their knowledge and skills. The BS Electrical Engineering program aims to prepare the graduates for corporate and governmental entry level jobs and/or to pursue further education at the graduate level worldwide.*

1.1.1 Objectives of BS Electrical Engineering

Following are four objectives of BS (EE) Program:

1. To inculcate graduates with technical competence through advanced and comprehensive knowledge of the practical aspect of electrical engineering, including analytical and design skills and of the technical tools to meet the engineering requirements.
2. To provide an undergraduate education that will further enable qualified students to pursue Graduate/Higher studies in electrical engineering and related fields
3. To cultivate Professional Development among graduates to manage multi-disciplinary teams, communicate effectively and have entrepreneurial skills.
4. To instill Ethical and Social Responsibility into graduates so that they can practice and take ethically and socially responsible decisions.

1.1.2 Alignment of Program Objectives with Mission Statement:

Program objectives are designed in a way that they are focusing on professional, ethical and social development of students.

1.1.3 Main Elements of Strategic Plan:

Following are the main elements of strategic plan to achieve mission and objectives of programs:

1) **Qualified Faculty**: Highly qualified faculty is hired, retained and developed to provide high quality teaching to students for their professional upbringing.
2) **Updated Curriculum**: Curriculum of BS (EE) consists of 43 courses including 28 core electrical engineering modules. The curriculum is updated on regular basis as per HEC policy and best practices in academia.
3) **Provision of High Quality Supporting Services**: High quality supporting services are provided through various departments e.g. Placement Office, Students Affairs Department etc. These departments provide technical and professional developmental opportunities to students on regular basis through arranging seminars, workshops, inviting guest speakers from industries, arranging IEEE week etc.
4) **Field Work/Internship Experience**: Students are facilitated in availing internship opportunities. Conducting internship is a part of their BS (EE) degree program. This field work experience gives them the practical exposure necessary to better align them with market requirements.
5) **Projects:** As a part of assessment mix, most courses have an element of conducting a small project either in group or individual capacity. These assessments facilitate in measuring learning outcomes of the courses on interim basis during the degree program. However, final year projects are carried out to assess the extent to which students are able to demonstrate learning outcomes of the program. These projects are also exhibited in a two days event “Open House”.
6) **Lab work:** Students are passed through rigorous lab work during their degree program to give them required hands on experience of applying laws of engineering in a closed environment. A minimum of 12-14 Labs are planned for each lab course Lab work is an

essential part of engineering education. The quality of the lab equipments and the utilization of the lab equipment is very high. The students use equipment in the lab to conduct the experiments, at the same time they are taught to use simulation software (Pspice, Matlab, Verilog, Multisim, Labview) to check and verify their circuit design. Lab work is not solely based on simulations.

1.1.4 Programs Objectives Assessment

Following table summarizes the details about programs' objective assessment:

Objective	How Measured	When Measured	Improvement Identified	Improvement Made
1	Alumni Survey Employer Survey	December 2013 November 2013	1. Introduction of new courses e.g. PLC Programming, Project Management etc. 2. Collaboration with the industry etc.	Under review in School of Engineering
2	Alumni Survey	December 2013	1. Ability to improve component designing skills 2. Introduction of new courses 3. Collaboration with industry	Under review in School of Engineering
3	Alumni Survey Employer Survey	December 2013 November 2013	1. Ability to work in teams 2. Presentation Skills	Under review in School of Engineering
4	Alumni Survey Employer Survey	December 2013 November 2013	1. Business ethics skills	Under review in School of Engineering

Table 1: Programs Objectives Assessment

Programs objectives are assessed through HEC Employers and Alumni Surveys on periodic basis. Results are discussed in relevant faculties to design implementation plan for corrective actions. (See **Annex 1 and 2** for samples of Employers' and Alumni Feedback Reports)

<u>Standard 1.2</u> Programs must have documented outcomes for graduating students. It must be demonstrated that the outcome support the program objectives and that graduating students are capable for performing these outcomes.

1.2.1 Outcomes of BS Electrical Engineering

Following are six outcomes of BS (EE) program:

1. The students will be able to conduct laboratory experiments with applications to electrical engineering problems by
   a. demonstrating proper use of laboratory equipment,
   b. building and testing circuits and/or systems,
   c. analyzing, interpreting experimental data in laboratory settings,
   d. recording and presenting experimental data in appropriate formats, &
   e. designing hardware, software or integrated hardware and software systems.

2. The students will be able to apply current technical information, circuit's simulation software, and appropriate mathematics to identify, analyze, and solve technical problems associated with electrical systems by
   a. solving electrical circuits problems fundamental to electrical and computer systems,
   b. demonstrating the application of appropriate software to solve technical problems, and the application of mathematics in solving technical problems,
   c. solving technical problems given a set of specifications,
   d. solving open-ended technical problems, &
   e. applying resource applicable technical information.

3. The students will be able to apply project management fundamentals with a commitment to quality, timeliness and continuous improvement in electrical and computer systems design and development by
   a. demonstrating fundamental project management techniques,
   b. discussing the basic principles of quality assurance and continuous improvement,
   c. demonstrating appropriate team skills, &
   d. demonstrating appropriate entrepreneurial skills.

4. The students will be able to communicate technical information clearly and concisely by
   a. communicating technical information through oral and presentation skills, &
   b. producing technical information through formal technical papers and reports.

5. The students will be able to exhibit knowledge necessary for career advancement in Engineering/ technical professions by
   a. appreciating the need and acquiring the ability to engage in lifelong learning,
   b. recognizing and describing several challenges when working in a diverse team environment, &
   c. describing several issues related to technology and society that are of a global nature.

6. The students will be able to appreciate professional, ethical and social issues related to the workplace by
   a. practicing time management, equality, justice and demonstrate respect for authority and law,
   b. understanding and practicing health, safety and environmental issues, &
   c. being aware of ethical issues related to plagiarism, copyright, discrimination and harassment.

1.2.2 Programs Objectives-Outcomes Matrix of BS (EE)

Table 1 provides the matrix of program objectives-program outcomes:

Program Objectives	Program Outcomes					
	1	2	3	4	5	6
1	■	■	■	■		■
2	■	■			■	
3			■	■		■
4						■

Table 2: Program Objectives and Outcomes

1.2.3 Means for assessing the extent to which graduates are performing the stated program outcomes/learning objectives:

Survey for graduating students is conducted once a year at the time of graduation to assess the students' satisfaction about the skills they have learned from the BS (EE) program. Results are discussed in relevant faculties to work on implementation plan for improvements. (See **Annex 3** for sample from graduating survey)

Apart from conducting alumni and employers surveys on periodic basis, final year projects are rigorously assessed by evaluators to measure the extent to which students have demonstrated the learning outcomes of the program. Further, a one day exhibition is arranged in the Campus to present the final year projects to industry.

Standard 1.3 Results of program's assessment and the extent tow which they are used to improve the program must be documented

All courses of BS (EE) are regularly assessed through HEC Proforma 1 and 10 i.e. Students course evaluation questionnaire and Teachers Evaluation questionnaire. (See **Annex 4** for Course and Teachers Evaluation Report). Results are meticulously discussed/analyzed between faculty and Head School of Engineering for improving quality of curriculum and teaching methodologies to better achieve stated learning outcomes. Apart from the above mentioned evaluation report, a consolidated feedback report for managers/HoD is prepared. This facilitates in identifying the best and least ranked teachers/courses of the program, calculating productivity level of the program in terms of CGPA band percentages etc. See **Annex 5** for Consolidated feedback report for HoDs. The data of student feedback about courses and teachers are also used to generate a comprehensive report for faculty members covering parameters like student feedback as compared to batch average, grading trend analysis, percentage of the classes conducted, assessment mix as compared to batch average etc. See **Annex 6** for Performance Assessment Report for faculty. Apart from these, periodic Semester Status Reports (**Annex 15**) are being generated to meticulously analyze various indicators e.g. grading trend, assessment mix etc. All these reports are discussed and corrective actions are taken to improve quality of the program.

1.3.1 Actions Taken based on the results of periodic assessment

Various actions have been taken on the results of periodic assessments e.g.

1) Alignment of lab courses with theory class contents
2) Introducing IEEE week to develop soft skills of students and enhancing links with industry
3) Launching of new elective(s) in BS (EE) Curriculum

4) Improvements in final year project management process

1.3.2 List strengths and weaknesses of the program

a. Strengths

1) Competitive faculty
2) Good learning environment
3) Advanced curriculum
4) Readily accessible learning resources

b.Areas for improvements:

1) Lab may be improved
2) More practical work in BS (EE) curriculum
3) Better supervision of final year projects

c. List significant future development plans for the program

1) A comprehensive faculty development program may be introduced with clear focus on pedagogy techniques.
2) Systematic collaboration with the industry may be worked on
3) Courses are in need to be made more interactive
4) More lab work may be introduced
5) Learning outcomes of courses may be aligned with market requirements

Standard 1.4 The department must assess its overall performance periodically using quantifiable measures

Following are some of the statistics used for assessing overall performance of BS (EE) periodically:

1.4.1 Student Statistics

S.No.	Batch	No of Students	Present strength	No of sections
1	Batch 09	160	122	3
2	Batch 10	160	136	3
3	Batch 11	160	094	3

4	Batch 12	160	145	4
	Total	640	497	13

Table 3: Students Statistics

1.4.2 Engineering Faculty

Dedicated Engineering Teachers	= 31
Shared Engineering faculty	= 04
Visiting Faculty for Engineering	= 02.5
Total Engineering Faculty	= 33.5

Table 4: Engineering Faculty

1.4.3 Credit Hours/Teacher

Average Credit Hours/Week = (17x4 + 17x3 + 16x3 + 13x3)/33.5 = 6.15

1.4.4 Student/Teacher Ratio

Total Engineering Students = 497

Total Engineering Teachers = 33.5

Student/Teacher Ratio = 14.83:1

1.4.5 Admission Response and %Age Admitted

Total Applicant in 2009 = 3365

Total Admitted in BS(EE) in 2009 at FAST-NU = 160

Percentage admitted = 160/3365 x 100 = 4.75%

Total Applicant in 2010 = 4796

Total Admitted in BS(EE) in 2010 at FAST-NU = 160

Percentage admitted = 160/4796 x 100 = 3.34%

Total Applicants on Open Merit for BS(EE) 2011 = 4240

Total Admitted in BS (EE) in 2011 on open = 137

Percentage Admitted: 137/4240= 3.23%

Total Applicant appeared in the OSP tests 2011 = 4947 (for All campuses)

Total Admitted in BS(EE) in 2011 at Islamabad campus = 23

Total Admission in BS (EE) 2011 = 137 + 23 = 160

Total Applicant in 2012 = 3202

Total Admitted in BS (EE) in 2012 at FAST-NU = 160

Percentage admitted = 160/3202 x 100 = 4%

1.4.6 Intake and Current Students

S#	Batch	No. of Students	Present strength	No. of sections
1	2010	160	136	3
2	2011	160	094	3
3	2012	160	145	4
4	2013	160	160	4
	Total	640	535	14

Table 5: Intake and Current Students

1.4.7 Cost per Student

The average cost per student is RS. 168,000/- per annum.

1.4.8 Yield

69% students have successfully graduated for the batches 2002-2008

1.4.9 Dropout

23% of intake Batch 2009

15% of intake Batch 2010

41% of intake Batch 2011

10% of intake Batch 2012

1.4.10 Average Duration

The average duration of course is four years, some students graduate a little late, 90% of the students complete their graduation in time

1.4.11 Research Publications

Faculty members have published about 26 papers in different HEC recognized journals (See **Annex 11** for the detailed list)

1.4.12 Students and Teachers Satisfaction

Students and faculty are mollified with the prevailing conditions of the department. Notwithstanding, there are certain steps to be taken to deal with various areas for improvements.

Criterion 2

Curriculum Design and Organization

Criterion 2: Curriculum Design and Organization

This criterion provides details about curriculum design and organization of BS (EE) program:

Title of Degree Program

BS Electrical Engineering

Definition of credit hour:

One credit hour is 1 hours of theory lecture or 3 hours of laboratory work in a week.

Degree plan

Following is the list of courses taught in the BS (EE) program.

Sr. #	Course Name	Code
1	Applied Calculus	MT117
2	Circuit Analysis I	EE216
3	Physics for Engineers	NS110
4	English Language	SS101
5	Programming for Engineers I	EE110
6	Circuit Analysis II	EE217
7	Differential Equations	MT203
8	Programming for Engineers II	EE112
9	Linear Algebra	MT104
10	Pakistan Studies	SS113
11	Basic Mechanical Engineering	ME101
12	Computer Logic Design	EE105
13	ComplexVariablesTransforms	MT220
14	Electronics I	EE214
15	Islamic & Religious Studies	SS111
16	Applied Thermodynamics	ME201
17	Numerical Methods	MT207
18	Signal & System	EE223
19	Electro-Mechanical Systems	EE221
20	Probability & Random Processes	EE319
21	Electrical Power Engineering	EE408
22	Electromagnetic theory	EE305
23	Feedback Control System	EE304
24	Instrumentation & Measurements	EE220
25	Microprocessor Interfacing & Prog	EE303
26	Analog & Digital Communications	EE214

27	Data Communication & Networks	EE317
28	CAD & Simulation	EE321
29	Digital Communication	EE313
30	Digital Signal Processing	EE302
31	Wireless & Mobile Communication	EE403
32	Technical Report Writing	SS142
33	Communication Skills	SS111
34	VLSI	EE309
35	Engineering Management	EE330
36	Fiber Optics Communication	EE406
37	Power Electronics	EE324
38	Telecom Transmission & Switching	EE416
39	Wave Propagation&Antenna Theory	EE407
40	Next Generation Networks	EE423
41	Engineering Ethics	SS145
42	Entrepreneurship	MG205
43	Microwave Engineering	EE308

Table 6: Degree Plan

Curriculum Breakdown

Following table gives the breakdown of curriculum in Maths and Basic Sciences, Core Courses, Humanities, and Electives: (See **Annex 8** for semester wise course offerings)

Semester	Course Number	Category (Credit Hours)				
		Math and Basic Science		Core Courses	Humanities and Social Sciences	Technical Electives / Others
		Math	Basic Science			
1	MT117 EE216 NS110 SS101 EE110	3	3	18	3	
2	EE217 MT203 EE112 MT104 SS113	6		17	3	
3	ME101 EE105 MT220 EE214 SS111	3	3	18	3	
4	ME201 MT207 EE223 EE221 EE319	3	3	17		
5	EE408 EE305 EE304 EE220 EE303			18		
6	EE214 EE317 EE321 EE313 EE302 EE403			16	6	8
7	SS142 SS111 EE309 EE330 EE406 EE324			17	6	8

8	EE416 EE407 EE423 SS145 MG205 EE308			13	6	4

Table 7: Curriculum Breakdown

Courses Information

Following table gives information about courses in terms of its title, objectives, pre requisites, and books:

1)Applied Calculus
a.Objective
The course is aimed at acquiring the basic techniques of differentiation and integration of functions of single variable. Stress will be given on the basic concepts of limit, continuity, graphing of functions, differentiation, integration and their practical applications in different fields.
b.Prerequisite
None
c.Books
Thomas' Calculus, Eleventh Edition

2)Circuit Analysis I
a.Objective
After completion of this course, the students should understand and be able to understand and apply the basic concepts of DC circuit analysis with op-amps and multiple energy sources and transient energy sources and transient analysis of first and second order circuits.
b.Prerequisite
None
c.Books
Electric Circuits, 8th Edition by James W. Nilsson and Susan A. Riedel

3) English Language
a.Objective
The aims are to: achieve proficiency in language use, develop skills in listening comprehension, improve reading efficiency, use the conventions of standard written
b.Prerequisite
None
c.Books

A text book of English prose and structure by Khattak Arif

4) Physics for Engineers
a.Objective
The course covers the basic concepts of Newtonian mechanics, digital electronics, and Electromagnetism which are required in computer sciences. It includes vectors, Motion Newton's law, logic circuits, electrostatics, and magnetism.etc. To help the students of BS in order to understand the basic concepts of physics which are useful for them in computer sciences.
b.Prerequisite
None
c.Books
Physics, Vol 1 &2 5th Edition by Halliday, Resnick and Krane,

5) Programming for Engineers I
a.Objective
Introduction to computers and computer programming in C. Developing medium level programs in C Emphasis on Data Representation, Storage in memory, Debugging skills
b.Prerequisite
None
c.Books
Object Oriented Programming in C++, 4th ed
Robert Lafore

6) Circuit Analysis II
a.Objective
Understand and apply the basic concepts of AC circuit analysis. The objective of this course is to build on the basic circuit analysis completed in Circuit Analysis I course. Upon completing the course the student will have the detailed knowledge of application of balanced three phase circuits and active filters and the application of Laplace Transform for the analysis of these circuits
b.Prerequisite
Circuit Analysis I (EE216)
c.Books
Electric Circuits, 8th Edition
James W. Nilsson and Susan A. Riedel

7) Differential Equations
a.Objective
Learn the basic techniques of solving Differential Equations and applying them to variety of problems arising in applied sciences and engineering
b.Prerequisite
MT117 Applied Calculus
c.Books
Differential Equations with Boundary Value Problems
Dennis G. Zill

8) Programming for Engineers II
a.Objective
Train 'engineering' students with medium level knowledge in C -Language: To understand the fundamental concepts of OOP. To be able to write medium complexity programs in C++ using OOP concepts with emphasis on data/memory representation.
b.Prerequisite
Programming for Engineers - I
c.Books
C++: How to Program, 6th ed. or later
Deitel & P.J. Deitel

9) Linear Algebra
a.Objective
As a basic course of mathematics the emphasis would be that the students should understand linear systems and their interpretation in terms of solutions. More over this course will be useful for the students in order to strengthen their logic and their ability to analyze the general linear systems with unknown quantities. By the end of this course students will be aware about some applications of linear systems in Electrical Engineering.
b.Prerequisite
None
c.Books
Linear Algebra and Its Applications (3rd Edition)
David C. Lay

10)Pakistan Studies
a.Objective

The purpose of the course is to inculcate patriotism in the students by understanding the historical process which led to the creation of Pakistan Developing an insight into the purpose for which the state of Pakistan was achieved Appraising the political problems in Pakistan Finding solutions for various social problems of Pakistan Analyzing Pakistan's relations with India and the challenge of the New World Order
b.Prerequisite
None
c.Books
Pakistan's Foreign Policy
Abdul Sattar

11) Basic Mechanical Engineering
a.Objective
This course gives introduction of basic concepts of Engineering Statics and dynamics like force, moment and couple, velocity, acceleration curvilinear motion etc. to the students. It will also introduce Equilibrium Conditions, Trusses, and Friction, kinematics and kinetics.
b.Prerequisite
None
c.Books
Engineering Mechanics Statics 6th Edition
J.L. Meriam and L.G.Kraige

12) Computer Logic Design
a.Objective
This course introduces computer digital design fundamentals. It starts with an introduction to number system and Boolean Algebra, discussing its linkage with the digital systems. Then it defines fundamental components of digital systems (logic gates and their operational characteristics) and explains minimization techniques. Both combinational and sequential circuit analysis and design are covered in detail. Different types of memories and PLD design techniques including FPGAs are explained.
b.Prerequisite
None
c.Books
Digital Design (Fourth Edition)
M. Morris Mano, Michael Ciletti

13) ComplexVariablesTransforms
a.Objective
To acquaint the students with the complex analysis, Fourier series and
transforms and their applications in engineering.
b.Prerequisite
MT117 Applied Calculus
c.Books
A first course in Complex Analysis with Applications.
Dennis G. Zill, Patrick D. Shanahon.

14) Electronics I
a.Objective
The objective of this course is to develop the ability to analyse and design diode and transistor circuits. Course starts with the study of the basic electronic device, the diode, the diode characteristics and models are studied followed by diode circuits and diode applications. The Bipolar transistor (BJT), its structure, operation and characteristics are discussed. Large and small signal models and its operation as an amplifier and switch are described. The third and last portion of the course covers the field-effect transistor (FET) family of devices. The structure, operation and characteristics of the FET are described. FET circuits and applications are discussed.
b.Prerequisite
Circuit Analysis II (EE217)
c.Books
Microelectronic Cirucits
Sedra/Smith

15) Islamic & Religious Studies
a.Objective
To provide Basic information about Islamic Studies, To enhance understanding of the students regarding Islamic Civilization based on Justice, To improve Students skill to perform prayers and other worships,
b.Prerequisite
None
c.Books
The Emergence of Islam
Dr. M Hamidullah

16) Applied Thermodynamics
a.Objective
This course gives introduction of basic concepts of thermodynamics, first law and second law of thermodynamics, control mass and control volume approaches and their application to power and refrigeration cycles. It will also introduce steady flow and non-steady flow processes and mixture analysis. To introduce the basic concepts of thermodynamics, like system, surrounding, work, heat and different processes to the students. To give introduction of power cycles and their applications. To prepare students to effectively use thermodynamics in the practice of engineering
b.Prerequisite
None
c.Books
Fundamentals of Thermodynamics
Wylen

17) Numerical Methods
a.Objective
To enable the students to understand the basic Numerical techniques and implement them in solving computational problems.
Lab: To implement numerical methods in MATLAB there will be one hour lab
per week.
b.Prerequisite
(MT104) Linear Algebra and(MT117) Applied Calculus
c.Books
Numerical Analysis (eighth edition)
Richard L. Burden, J. Douglas FairesBrooks/Cole

18) Signal & System
a.Objective
The aim of this course is to develop a detailed understanding of LTI systems through mathematical analysis. It will enable the students to have deep insight about the information contents of a signal and the different ways to process this information, understand the critical issues in linear systems and get a vision to improve those. The students should be able to implement various systems in Matlab and process the information according to the requirements with due consideration to stability issues The course is about analysis and processing of information and system design for required processing. It starts with introduction to signals and systems concepts and then talks in detail about LTI systems with a number of examples. This course discusses the concept of spectrum in detail, followed by

information digitization and aliasing issues. The course involves detailed study of the stability of systems and a number of transforms including Fourier transform.
b.Prerequisite
Linear Algebra and Differential Equations
c.Books
Signal Processing First
James H.McClellan, Ronald W.Schafer & Mark A. Yoder

19) Electro-Mechanical Systems
a.Objective
The objective of this course is to develop the understanding of different Ac and dc machines used in everyday life. Course is designed to provide students with an understanding of Working of transformers; The general principles of electromechanical machine operation, rotating magnetic fields, and power conversion; Design process for sizing, powering and controlling rotational machines; Methods for calculating and measuring machine parameters; A general overview of variable speed and dc machine drives .
b.Prerequisite
Circuit Analysis II
c.Books
Electrical Machines, Drives, and Power Systems
Theodore Wildi

20) Probability & Random Processes
a.Objective
Probabilistic tools are more useful for modeling real system and doing performance analysis. This course is design to provide students with the ability to understand and conduct system modeling and performance analysis.
To establish the necessary background, the course starts with an introduction to basic probability tools & concepts. The essential concepts are made clear through different examples. The new material related to subject matter also followed by set of examples.
b.Prerequisite
None
c.Books
Introduction to Probability & Statistics 4th Edition
J.Susan Milton, Jesse C. Arnold

21) Electrical Power Engineering
a.Objective
To familiarize students with electrical process from Generation till consumption
b.Prerequisite
(EE221) EMS
c.Books
Electrical Power System Basics
Steven W. Blume

22) Electromagnetic theory
a.Objective
The course focuses on electricity and magnetism, including electric fields, magnetic fields, electromagnetic forces, conductors and dielectrics and electromagnetic waves
b.Prerequisite
CVT MT220, Applied Calculus MT 117
c.Books
Fundamentals of Applied Electromagnetic, International Edition
Fawwaz T. Ulaby

23) Feedback Control System
a.Objective
Construct a mathematical model, block diagram and signal flow graph for a
physical lumped parameter system. Derive a linear time-invariant mathematical model from a mathematical model. Perform stability and sensitivity analysis on systems, design cascade and feed forward compensators to meet transient and frequency response specifications. Use computer-aided control tools to verify root locus, transient and frequency response characteristics of a system and be able to control systems according to some given specifications.
b.Prerequisite
EE223: Signals & Systems
c.Books
Automatic Control Systems, 8th edition
B.C. Kuo

24) Instrumentation & Measurements
a.Objective
To acquaint the students with the concepts, methods and instruments for measuring electrical and

non-electrical quantities
b.Prerequisite
EE206 Signal & Systems
EE214 Electronics I
c.Books
Elements of Electronic Instrumentation and Measurement
Joseph J. Carr

25) Microprocessor Interfacing & Prog
a.Objective
Learn the design of stand-alone microcontroller based systems. Students will learn to use data sheets and select appropriate components for designing and implementing the microcontroller system. Assembly language programming will be used to write effective programs
b.Prerequisite
(EE214) Electronics I (EE105) CLD
c.Books
The 8051 Microcontroller and Embedded Systems
M. Ali Mazidi

26) Analog & Digital Communications
a.Objective
To familiarize students with the fundamentals of analog and digital communication systems and to provide students with tools for communication signal analysis.
b.Prerequisite
None
c.Books
Modern Digital and Analog Communication Systems(4th Edition)
B.P Lathi

27) Data Communication & Networks
a.Objective
Develop understanding of protocols stacks, communication models, Network hardware and network software. Learn the functionality of computer and how network performance is effected. Develop analytical approach for designing, implementing and analyzing various aspects of computer networks.
b.Prerequisite
None

c.Books
Data Communication And Networking, 4th Ed
B A Forouzan

28) CAD & Simulation
a.Objective
To introduce the use of CAD tools in the simulation, analysis and design ofelectronics Integrated Circuits and systems To provide a comprehensive understanding of complete IC design flow using CAD tools To provide coherent knowledge of simulation techniques for different electronics circuits using CAD tools with hands on lab exercises and design assignments & project
b.Prerequisite
Electronics, Computer Logic Design
c.Books
Principles of CMOS VLSI Design-A Circuits and Systems Perspective
Neil Waste and David Harris

29) Digital Communication
a.Objective
To become familiar with the performance capabilities of current digital communication systems. To understand the conceptual and analytical differences between analog and digital communications. To design an appropriate transmitter for digital communication. To understand the significance and validity of the signal space model for detection of digital signals. To be able to do a comparative analysis of the noise performance of different modulation systems, and design appropriate receiver structures to achieve given design goals
b.Prerequisite
(EE223)Signal and systems (EE 319) Probability and random process
c.Books
Digital Communication Fundamentals and Application
Bernard Sklar

30) Digital Signal Processing
a.Objective
To introduce signals, systems, time and frequency domain concepts and associated mathematical tools that are fundamental to all DSP techniques. Provide a thorough understanding and working knowledge of design, implementation, analysis and comparison of digital filters for processing of discrete time signals

b.Prerequisite
(EE 223) Signal & System
c.Books
Discrete-Time Signal Processing (Second Edition)
Allan V. Oppenheim, Ronald W. Schafer

31) Wireless & Mobile Communication
a.Objective
This Course is designed to give students a detailed insight into the field of digital wireless communications from the understanding of the Wireless Mobile terrestrial channel to the design of the equipment required to mitigate the radio constraints imposed by the wireless environment.
b.Prerequisite
EE306 Analog Communication
EE311 Data Communication & Networks
c.Books
Wireless Communications: Principles and Practice
Theodore S. Rappaport

32) Technical Report Writing
a.Objective
The course will introduce students to the basic principles of effective technical report writing, class activities, group discussions and research projects shall gear them towards meeting the objective. The issues and problems of planning and designing technical presentations and documents for varying situations and audiences are also dealt with in the course. The course aims at adding to the students' competence in technical report writing and designing different types of technical documents. Students are familiarized with the mechanics and conventions of technical writing through learner-centered approach.
b.Prerequisite
None
c.Books
Technical Report Writing Today - Eighth Edition
Pauley and Riordan

33) Communication Skills
a.Objective
Effective communication is the fragrance of blossomed soul. This course will provide practical,

usable, relevant skill practice and personalized feedback on oral communication critical to professional success. Special attention will be given to methods used by the leaders to create credible persuasive messages that engage and involve audience.
b.Prerequisite
None
c.Books
Effective Communication and Soft Skills: Strategies for Success
Nitin Bhatngar , Mamta Bhatnagar

34) VLSI
a.Objective
To provide a coherent introduction and knowledge to VLSI design in CMOS
Design rules and their relationship to circuit topology. Alternative circuit and system design strategies. The CMOS design tradeoffs in terms of area, speed and power.
b.Prerequisite
Electronics, Computer Logic Design
c.Books
Principles of CMOS VLSI Design-A Circuits and Systems Perspective,
Neil Waste and David Harris

35) Engineering Management
a.Objective
Understand and apply the basic concepts of Engineering Management. Toprovide an insight into all functions within an organization; basic principle of management; Business environment within an organization. Corporate strategy formulation and decision making skills; Introduce Project Management skills; Leadership and motivation; Marketing and sales management; Relating theory with practice by discussing case studies
b.Prerequisite
(MG222) Engineering Economics
c.Books
Engineering Management by
Fraidoon Mazda

36) Fiber Optics Communication
a.Objective
The objective of the course is to provide a fundamental understanding of light wave communication

systems. It will provide a practical introduction to the basic principles of optical fiber systems and networks. The course will emphasize the physical properties and operation of components (step and graded index optical fibers that support single and multimode transmission, various dispersion mechanisms, coherent (LASER) and incoherent (LED) optical sources and PIN and APD optical receivers etc.) that comprise optical systems. The basic elements of optical network operation will also be described. The material will cover a broad number of topics to allow the student to understand the underlying principles of the field and to be prepared for more detailed study in the form of advanced courses and/or research.
b.Prerequisite
None
c.Books
Fiber Optic Communications, 5th or 4th edition
Joseph C. Palais

37) Power Electronics
a.Objective
The objective of this course is to build understanding of high current electronic circuits using power semiconductor devices in the switching mode rather than in the linear mode. The subject deals with the modern power semiconductor devices, their characteristic, both static and switching, and their drive circuit design. Topologies of power electronic circuits for applications in controlled rectification, inversion, dc-dc conversion, and ac-ac conversion, their control techniques are covered. Applications of power electronic equipment are also included with emphasis on dc and ac motor drives.
b.Prerequisite
None
c.Books
Power Electronic Circuits: Devices and Application
Rashid, H

38)Telecom Transmission & Switching
a.Objective
To Widen Students understanding of PSTN Switching, Signaling & Transmission
b.Prerequisite
EE405 Telecommunication Systems
c.Books
Telecom Switching, Traffic & Networks
J E Flood

39)Wave Propagation&Antenna Theory
a.Objective
This is the second level course after the students take foundation course electromagnetic engineering. The main focus of this course is to apply the concepts studied in the first course in areas such as wave propagation and antennas. Basically this course covers three main areas of applied electromagnetic i.e. wave propagation, transmission lines and antennas. This course will provide a good foundation for the students to enhance their knowledge to undertake advance courses such as applied microwave engineering.
b.Prerequisite
EE305 Electromagnetic Engineering
c.Books
Fundamentals of Electromagnetic with Engineering Applications
Antenna Theory, 3rd Edition.
Stuart M. Wentworth
C. A. Balanis

40)Next Generation Networks
a.Objective
The objective of this course is to introduce and explain Next Generation Networks including components & Protocols and keeping in view the migration strategies involved from Legacy Network to NGN.
b.Prerequisite
None
c.Books
Technical Literature / Manuals of Huawei , ZTE and Alcatel regarding NGN

41)Engineering Ethics
a.Objective
To equip students for field life
b.Prerequisite
None
c.Books
Engineering Ethics

42)Entrepreneurship
a.Objective

The purpose of this course is to expose students to the ideas, mind set, thinking and techniques related to researching and starting up a new business idea. Through a combination of lecture, field work, library and internet research guest lecturers, and video students will assess the feasibility of an opportunity that could be pursued within or outside of the confines of the organization
b.Prerequisite
MG222 Engineering Economics
c.Books
Essentials of Entrepreneurship and Small Business Management, 6th edition
Norman M Scarborough

43)Microwave Engineering
a.Objective
This course will provide a comprehensive understanding of Microwave electronics, components and systems. The main objective is to study the concept of basic microwave engineering and its application in detail.
b.Prerequisite
EE407 Wave Propagation and Antenna Theory
c.Books
Microwave Engineering, David M Pozar.

Standard 2.1 The curriculum must be consistent and supports the program's documented objectives.

The curriculum of BS Electrical Engineering has been organized in four groups/categories i.e.

1) Mathematics
2) Electrical and Electronic Engineering
3) Interdisciplinary Engineering
4) Management Science/Humanities

Following is the details of the above mentioned groups with relevant courses:

1) Group/Category 1: Mathematics

Linear Algebra	MT104;
Applied Calculus	MT117;
Differential Equations	MT203;

Numerical Methods	MT207;
Complex Variables Transforms	MT220.

2) Group/Category 2: Electrical Engineering

Computer Logic Design	EE105;
Programming for Engineers I	EE110;
Programming for Engineers II	EE112;
Electronics I	EE214;
Analog & Digital Communications	EE214;
Circuit Analysis I	EE216;
Circuit Analysis II	EE217;
Instrumentation & Measurements	EE220;
Electro-Mechanical Systems	EE221;
Signal & System	EE223;
Digital Signal Processing	EE302;
Microprocessor Interfacing & Prog	EE303;
Feedback Control System	EE304;
Electromagnetic theory	EE305;
Microwave Engineering	EE308;
VLSI	EE309;
Digital Communication	EE313;
Data Communication & Networks	EE317;
Probability & Random Processes	EE319;
CAD & Simulation	EE321;
Power Electronics	EE324;
Engineering Management	EE330;

Wireless & Mobile Communication	EE403;
Fiber Optics Communication	EE406;
Wave Propagation&Antenna Theory	EE407;
Electrical Power Engineering	EE408;
Telecom Transmission & Switching	EE416;
Next Generation Networks	EE423.

3) Group/Category 3 Interdisciplinary Engineering

Basic Mechanical Engineering	ME101;
Applied Thermodynamics	ME201.

4) Group/Category 4 Management Sciences/Humanities

English Language	SS101;
Islamic & Religious Studies	SS111;
Communication Skills	SS111;
Pakistan Studies	SS113;
Technical Report Writing	SS142;
Engineering Ethics	SS145.

Course Groups and Program Objectives

Following table links groups with programs objectives to facilitate in achieving the stated mission and vision of BS (EE) program:

Courses Groups	Objectives					
	1	2	3	4	5	6
1 EE	x	x	x	x		
2 IDE			x			
3 SS				x	x	x
4 MT	x	x				

Table 8: Courses vs. Programs Objectives

Table 4: Courses versus Program Objectives

Standard 2.2 Theoretical backgrounds, problem analysis and solution design must be stressed within the program's core material.

Following table summarizes/categorizes the subjects taught in curriculum of BS (EE) in the following elements:

1) Theoretical Background
2) Problem Analysis
3) Solution Design

Elements	Courses	
1. Theoretical Background	Circuit Analysis I	EE216;
	Computer Logic Design	EE105
	Electronics I	EE214
	Electrical Power Engineering	EE408
	Electromagnetic theory	EE305
	Analog & Digital Communications	EE214
	Data Communication & Networks	EE317
	Digital Communication	EE313
	Wireless & Mobile Communication	EE403
	VLSI	EE309
	Engineering Management	EE330
	Fiber Optics Communication	EE406
	Telecom Transmission & Switching	EE416
	Wave Propagation&Antenna Theory	EE407
	Next Generation Networks	EE423
	Microwave Engineering	EE308
2. Problem Analysis	Programming for Engineers I	EE110;
	Programming for Engineers II	EE112;
	Signal & System	EE223
	Electro-Mechanical Systems	EE221
	Probability & Random Processes	EE319
	Feedback Control System	EE304

3. Solution Design	Circuit Analysis II	EE217;
	Instrumentation & Measurements	EE220
	Microprocessor Interfacing & Prog	EE303
	Power Electronics	EE324
	Digital Signal Processing	EE302
	CAD & Simulation	EE321

Table 9: Theoretical Background, Problem Solving, and Solution Design

Standard 2.3 The Curriculum must satisfy the core requirements for the program as specified by the respective accreditation body.

B.S Electrical Engineering program is accredited by the Pakistan Engineering Council (PEC) and has no deviation from PEC requirements. Minimum Requirements for each program (Program Semester Credit Hours). Following table gives summary of the distribution of credit hours of various groups

Program	Maths & Basic Sciences	Engineering Topics (Electrical & Mechanical)	General Education (Humanities & Management Sciences)	Others (Computer Sciences)	Electives
B.Sc Electrical Engineering (Communication)	21+1	65+24	6	6+3	

Table 10: Programs Credit Hours

Table 6: Program Credit Hours

Standard 2.4 The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body.

Same as Standard 2-3.

Standard 2.5 The curriculum must satisfy general education, arts and professional and other discipline requirements for the program as specified by the respective accreditation body.

Same as standard 2-3 and Standard 2-1 as defined above.

Standard 2.6 Information technology component of the curriculum must be integrated throughout the program

Semester 1 contains the 4 credit hours Programming for Engineers I out of which 3 credit hours are for theoretical work and 1 credit hour is for laboratory work. This course gives the basics of programming.

Semester 2 contains Programming for Engineers II which allows students to develop engineering applications and Advanced programming concepts.

Standard 2.7 Oral and written communication skills of the student must be developed and applied in the program.

1. English Language

This course will bring proficiency in English language use in students. This will be achieved by developing skills in listening comprehension, improving reading efficiency etc.

2. Communication Skills

Effective communication is the fragrance of blossomed soul. This course will provide practical, usable, relevant skill practice and personalized feedback on oral communication critical to professional success. Special attention will be given to methods used by the leaders to create credible persuasive messages that engage and involve audience.

The course comprises of lectures, individual presentations, group presentations, art of video narration, panel discussions, interviews, intended to blend theory with current practices .Assignment, research projects will be amalgamated with the skills learned in class.

3. Technical Report Writing

The course will introduce students to the basic principles of effective technical report writing, class activities, group discussions and research projects shall gear them towards meeting the objective. The issues and problems of planning and designing technical presentations and documents for varying situations and audiences are also dealt with in the course. The course aims at adding to the students' competence in technical report writing and designing different types of technical documents. Students are familiarized with the mechanics and conventions of technical writing through learner-centered approach.

Criteria 3

Laboratory and Computing Facilities

Criterion 3: Laboratories and Computing Facilities

This criteria provides details about laboratories and computing facilities provided to BS (EE) to support in achieving stated program's objectives and outcomes.

NU-FAST Islamabad has established various laboratories for students to practice their learning outcomes in electrical engineering discipline. Following is the list of available laboratories in Islamabad Campus:

1. Circuit Lab
2. Physics Lab
3. Engineering Workshop
4. Microprocessor Interfacing & Digital Electronics Lab
5. Electronics Lab
6. Machine Lab
7. Instruments & Measurement Lab
8. Control Lab
9. Communication Lab
10. Wave Propagation & Antenna Lab
11. Data Communication & Network Lab

The details about the labs in terms of location, objectives, courses taught, softwares available etc. are given below:

Laboratory Title	**Circuit Lab**
Location & Area	Room 123
Objectives	Teach fundamentals of electronics circuit implementation.
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Circuit Analysis –I Electronics-I Engineering Workshop
Software Available	Nil
Major Apparatus / Equipment	• Power Supply • Oscilloscope • Function Generator • Digital-Multi-Meter

	• Wire Stripper
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	**Physics Lab**
Location & Area	Room G15
Objectives	Teach fundamentals of physics
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Physics for Engineers
Software Available	Data Studio
Major Apparatus / Equipment	• Electricity, • Magnetic force on wires, • Faraday's cages and structures, • Van De Graff generator
Safety Regulations	See Annex 14 for Safety Policy

Laboratory Title	**Engineering Workshop**
Location & Area	Room G50, G53
Objectives	Use of lab tools in design and fabrication of simple engineering components
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Engineering Workshop
Software Available	Ultiboard (for PCB design)
Major Apparatus / Equipment	• Tools for Metal work • Tools for Wood work • Tools for Electric work • Printed Circuit Board

Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	**Microprocessor Interfacing & Digital Electronics Lab**
Location & Area	Room E219
Objectives	Design and implementation of microprocessor systems
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Computer Logic Design Microprocessor Interfacing & Programming
Software Available	Keil, Proteus, IC Burning Software, Veiloger
Major Apparatus / Equipment	• Oscilloscope • Digital Trainer • Controller Kit • IC Programmer • Wire Stripper • Computer
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	**Electronics Lab**
Location & Area	Room 122
Objectives	Design and implementation of electronics circuit
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Circuit Analysis –I Electronics-I Engineering Workshop
Software Available	Multisim

Major Apparatus / Equipment	• Power Supply • Oscilloscope • DMM • Function Generator • Digital-Multi-Meter • Wire Stripper
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	**Machine Lab**
Location & Area	Room G23
Objectives	Learn fundamentals of electrical machines and their operations
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Electro Mechanical System
Software Available	Nil
Major Apparatus / Equipment	• Transformer Trainer • AC Machine Trainer • DC Machine Trainer
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	**Instruments & Measurement Lab**
Location & Area	Room 116A
Objectives	Design and implementation of measurement circuits
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Instrument & Measurement
Software Available	LabVIEW
Major Apparatus / Equipment	• Data Acquisition Unit • Sensor Kit • Computers
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	Control Lab
Location & Area	Room 116
Objectives	Learn and design simple feedback control systems
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Feedback Control
Software Available	LabVIEW, Matlab
Major Apparatus / Equipment	• NI ELVIS QNet • Rotary Pendulum • QNet DC Motor Control • PLC Trainer • Inverted Pendulum • Magnetic Levitation • Computer
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	Communication Lab
Location & Area	Room E221
Objectives	Learn and desing simple communication circuits
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Analog & Digital Communication
Software Available	Matlab
Major Apparatus / Equipment	• Communication Trainer • Oscilloscope • DMM • Computer
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	**Wave Propagation & Antenna Lab**
Location & Area	Room 119
Objectives	Learn fundamentals of antenna theory
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Wave Propagation & Antenna Theory
Software Available	NEC-Win, HFSS 11
Major Apparatus / Equipment	• Transmission Line Trainer • Oscilloscope • Antenna Trainers • DMM • Micro Strip Trainer • Microwave Trainer • Computer
Safety Regulations	See **Annex 14** for Safety Policy

Laboratory Title	**Data Communication & Network Lab**
Location & Area	Room E214
Objectives	Design and implementation of small area networks
Adequacy for Instruction	All required instructions are displayed in the lab on notice boards for use by faculty, students and support staff
Courses Taught	Data Communication & Network Lab
Software Available	Dual boot with GCC installed on Linux/Fedora, Cisco Packet Tracer, Wireshark/Ethereal
Major Apparatus / Equipment	• Network Switches • Network Routers • Crimping Tool • Cable Tester • Computer
Safety Regulations	See **Annex 14** for Safety Policy

There is a periodic assessment mechanism for monitoring the quality of labs for effective teaching. (See **Annex 7** for SoE lab assessment report).

Standard 3.1 Laboratory manuals/documentation/instructions for experiments must be available and easily accessible to faculty and students.

Availability of documentation/instructions to faculty and students for experiments

The lab manuals are readily available on SLATE (Learning Management System of NUCES) for ready accessibility to students, faculty, lab engineers, and other stakeholders. Further hard copies of the documents are available with the lab incharge and lab engineers of the relevant labs.

Process of issuing the documents to students and faculty

Electronic copy of the lab manual may be gained from lab incharge and academic officer through an email request.

Custodian of the manual

Lab Engineers are the custodian of the relevant lab manuals. A reference copy is also available in department academic officer.s

Standard 3.2 There must be support personal for instruction and maintaining the laboratories.

No. of staff members for each labs.	07
No. of laboratory Assistant	04
No. of laboratory Attendant.	02

Job descriptions of staff and laboratory attendants

Lab Supervisor (01)

- Management of all engineering labs
- Purchasing for all engineering lab components and equipment

Lab Assistants (04)

- Maintenance of lab equipment
- Assist lab engineer during lab work

Lab Attendant (02)

- Cleaning and dusting of lab

Standard 3.3 The University computing infrastructure and facilities must be adequate to support program's objectives.

Three fully dedicated labs for supporting BS (EE) computer aided courses is developed named "Rohtas Lab, Kohsar Lab, and Potohar Lab". These have the capacity of 120 computers equipped with updated simulation based softwares. Further the University provides very competitive computing facilities to students and staff in meeting program's objective. Currently the student to computer ration is 3:1. Further the University is running two learning management systems i.e. NeON and SLATE with wide range of features and facilities. These learning management systems provide adequate support to faculty and students in the domains of access electronic teaching and learning aids for lectures, maintaining attendance records, declaration of results, making announcements, managing final year and course projects, marking assignments etc.

Criteria 4

Student Support and Advising

Criterion 4: Student Support and Advising

The culture in FAST NU is that teachers and students have facility of frequent interaction, even after classes, for any professional and academic advice. Further faculty must ensure and display student discussion slots. Students may contact them in case of any support required to facilitate their learning.

Standard 4.1 Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner.

4.1.1 Courses offering policy

Sequence for course offering is the one mentioned in the University's prospectus (in the light of PEC and HEC guidelines). Logic of adopted sequencing is to develop concepts from basic level to advanced levels (in the light of attaining program's objectives and outcomes). See **Annexure 8** for the sequence of the course offered in BS (EE).

4.1.2 Frequency of Courses that are being offered from outside of the department

Department academic office gets in touch with that of other departments well before the commencement of semester to offer the required courses as per the set schedule to avoid any clashes. During a course allocation meeting, courses are assigned to relevant faculty members.

Standard 4.2 Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants.

Courses are allocated in a faculty meeting prior to the commencement of a semester. In case of more than one faculty teaching a course, regular meetings are conducted on periodic basis between the faculty members to align the delivery of course contents to achieve stated objectives and outcomes. Further, students from different sections are encouraged to participate in providing feedback and their views about course contents during and after the classes to help in synchronization. Moreover, in each course students are given assignments, quizzes and project to help create better understanding of courses. Majority of engineering courses have lab which support the concepts learned in the class rooms.

Standard 4.3 Guidance on how to complete the program must be available to all students and access to qualified advising must be available to make course decisions and career choices.

Students are informed about the program requirements at the start of the program during orientation week by the Campus Director. In-Charge Program acts as advisor to guide students to choose appropriate courses and also provide guidance on different issues. A student handbook is also provided to students during the semester and program, which is being evaluated at the end of the program to take necessary improvement. At the end of 5th semester, students are guided about the specialization themes and the elective courses which they can select.

In-charge academic office provides professional counseling to students when needed. Students can get in touch directly with him/her for any advice. Apart from this, faculty members are also appointed as student advisors from whom students may contact in contacting hours.

In charge placement arranges industrial tours for students to improve their subject vision and technical know-how. He/She also invites professionals from different industries to conduct interactive sessions with students for advice on professional matters/future career planning.

Program department secretary maintains a list of professional societies and technical bodies, that is provided to students on demand and students can get membership of such organizations on individual basis. IEEE Chapter is also opened in FAST NU to encourage students in becoming member of it.

Criteria 5

Process Control

Criterion 5: Process Control

This criterion provides details about various processes connected to BS (EE) program for ensuring smooth structuring to achieve stated objectives and outcomes.

<u>Standard 5.1</u> The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.

The admission is done once a year, in fall semester. Applicants should have minimum of 50% in FSc or equivalent and 60% in Matriculation or equivalent to be eligible to appear in entry test of the program. A cut off point in entry test score is developed for inducting the best suitable candidates. (See **Annex 9** for Admission criteria)

Indirect admissions may also be addressed in the form of credit hours transferring (if applicable). Notwithstanding, students have to quality the admission test and should have received an offer for admission to be eligible for transferring of credit hours.

Admission criteria are evaluated as per the dynamics of the environment.

<u>Standard 5.2</u> The process by which students are registered in the program and monitoring of students' progress to ensure timely completion of the program must be documented. This process must be periodically evaluated to ensure that it is meeting its objectives.

The student's name, after completion of the admission process, is forwarded to the Registrar office for registration in the specific program and the registration number is issued. Progress of the students are monitored rigorously by Academic Officers through NeON (Learning management system of the University) for timely completion of the degree program.

Various assessment methodologies e.g. assignments, sessionals, midterm tests and final examinations at the end of each semester, laboratory work etc are used to evaluate students' performance.

Academically weak students, those on academic warning 1 and 2 are processed separately from normal students. Parents fo academically weak students are regularly updated about their child's academic progress and attendance. Students on academic warning 12 are not allowed to register unless a meeting between the parents and HOD has taken place.

Standard 5.3 The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that it is meeting with its objectives.

Faculty induction process

Positions to be filled are advertised in the local/national newspapers, applications are received by the HR office, scrutinized by the respective HoDs through preliminary interviews and demonstrations, and finally interviewed by the University selection board for selection.

HEC proforma # 5 is used every semester to measure faculty satisfaction and HEC Proforma 10 is used to evaluate faculty performance every semester. **(**See **Annex 10** for Faculty Survey)

Standard 5.4 The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives.

The quality of programs in terms of teaching and delivery of course material to students is continuously assessed by HoDs and QEC.

HEC proformas # 1, 2, and 10 are used every semester are to evaluate teaching methodology, delivery of curriculum, and contents etc. The results are discussed in relevant faculty meeting

by HoDs for potential improvements identified by students. (See **Annex 4** reports on course and teachers feedback by using HEC Proforma 1 and 10**,** and **Annex 6** for semester performance assessment reports for faculty)

<u>Standard 5.5</u> The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

The program is run on semester basis with pre defined and approved structure of curriculum. At the end of each semester examinations are held to evaluate the students' semester progress . There is a minimum CGPA requirement to be maintained by students for being eligible to join next semester. At the end of 8th semester all students are required to submit their respective projects. Student's final results are announced on the basis of projects results and examination results.

HEC Proforma 3 (Survey of Graduating Students) is used annually to measure program's learning outcomes. (See **Annexure 3** for survey of graduating students)

Criteria 6

Faculty

Criterion 6: Faculty

<u>Standard 6.1</u> There must be enough full time faculties who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline.

Program Area of Specialization	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with Ph.D Degree
Electrical & Electronics	Circuit Analysis I Circuit Analysis II Power Electronics Electronics I Instrumentation & Measurement	Engr. Aamer Munir Engr. Azhar Rauf Engr. Raza Raheem Engr. Adnan Seed Engr. Muhammad Ibrar Khan Dr. Mukhtar Ullah Dr.Shahzad Saleem	02
Digital Electronics	Microprocessor Interfacing & Programming Computer Logic Design	Muhammad Rashid Karim Dr.Ataul Aziz Dr.Waseem Ikram Dr.Waqar Ahmad Engr. Durdana Habib	03

Signal Processing	Signal and Systems Digital Signal Processing Feedback Control system Probability and Random Variable	Engr. Durdana Habib Dr. Shahzad Saleem Dr. Mukhtar Ullah	
Microwaves	Electromagnetic Theory Microwave Engg	Abdullah Nouroze Adnan Saeed	00
Physics	Physics for Engineers	Attique Dawood	00
Humanities/ Managment	English Language Islamic & Religious Studies Pakistan Studies Complex Variables & Transforms Entrepreneurship Engineering Management Engineering Drawing	Huma Batool Dr.Mahboobullah Talat Khursheed Dr.Mazhar Hussain Shahzad Ahmad Dr.Muhammad Saeed	03
Telecommunications	Data Communication & Networks Telecommunication Systems	Dr.Muhammad Saeed Shahid Qureshi Aamer Hafeez	01
Programming	Programming For Engg 1 Prog For Engg 2	Amer Munir	
Total	**23**	**22**	**8**

Table 11: Faculty Distribution by area of specializations

Standard 6.2 All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place. Effective Programs for Faculty Development

Faculty members remain current in their respective areas as per University policy in the light of HEC guidelines. All faculty members submit their professional resumes on HEC Performa number 9 (Faculty Resume) once a year. This information is analyzed to track their development and to remain fit for the concurrency of the post. (See **Annex 16** for Faculty Resume)

6.2.1 Faculty loading policy of the University to ensure provision of sufficient time for scholarly activities

All faculty members are assigned with 9 credit hours of teaching. Further flexi working hours policy is being practiced to facilitate faculty in adjusting their teaching and researching hours. (See **Anex 11** for Faculty Research Publications)

6.2.2 Facilities, the full time faculty members are having to conduct scholarly activities

All faculty members are given a laptop, an office, equipped with internet facility. Faculty members are fully authorized to all online and off line material in library to prepare their lectures and conducting research.

6.2.3 Faculty development program being offered by the University

Faculty development is the core of NUCES School of Engineering management policy. Various faculty development workshops, training sessions etc. are regularly organized in NUCES, Islamabad. Faculty is encouraged to fully participate in such sessions. Apart from this, faculty is also sponsored to attend any training session being organized at national level to upgrade their skills and knowledge. Further, the university also encourages the faculty to participate in research activities by providing them sufficient financial support within or outside university. (See **Annex 13** for training details of faculty members)

Standard 6.3 All faculty members should be motivated and have job satisfaction to excel in their profession.

Faculty members are motivated through public appreciation and Annual Performance Reports. Special increments in salary are granted to those faculty members who outperform during the year academically/in administratively.

The faculty survey of the program using HEC Performa number 5 is conducted to measure faculty satisfactions on various parameters e.g. environmental factors, research facilities, satisfaction with remuneration etc. Results are compiled and discussed in the faculty of relevant schools for improvements and setting implementation plans. **(See Annex 10 for Faculty Survey details)**

Criteria 7

Institutional Facilities

Criterion 7: Institutional Facilities

Standard 7.1 The institution must have the infrastructure to support new trends in learning such as e-learning.

7.1.1 Infrastructure and facilities that support new trends in learning

The university has provided e-learning facilities to faculty members and students through its in house learning management systems i.e. NeON, SLATE. Each faculty member has a computer system with access to internet and e- library section.

7.1.2 Adequacy of the facilities

Whole campus is equipped with wifi facility to enable students in accessing online resources from learning management systems or others. Further sufficient computers with updated softwares are provided in laboratories for students' use in carrying out their academic activities. In addition, library is equipped with a number of computers for students to access e-learning section. Every student has been provided with user ID to access the e-learning resources from within the university library. The university library has access to international scholarly databases. Sufficient support staff is deputed in the library to look after the e-learning resources.

Standard 7.2 The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.

Adequacy of the library's technical collections

The university library has enough technical books in hard copies and soft copies to support the program learning objectives. The internet access to the external universities libraries provides opportunities to the students and faculty to obtain knowledge from their technical resources. Library is subscribed to the following databases, apart from various journals and magazines:

- HEC Digital Library (All Countrywide Resources)
- E brary
- IMF E Library

The library is staffed with about 10 professionals to facilitate students and faculty members in acquiring their desired stuff.

Standard 7.3 Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities.

7.3.1 Adequacy of the class rooms

Sufficient class rooms are available to run the program as per desired schedule. All class rooms are fully equipped with necessary equipment to provide environment conducive to learning e.g. whiteboards, multimedia, air conditioners etc.

7.3.2 Adequacy of the faculty offices

Most of the faculty offices are individually occupied. These are fully equipped with all facilities required to enable them in carrying out their responsibilities e.g. computer, internet and printing facilities, air conditioner, access to online resources etc.

Criteria 8

Institutional Support

Criterion 8: Institutional Support

Standard 8.1 There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars.

Faculty positions are advertised throughout the year periodically to attract highly qualified pedagogues. Faculty is retained by various means e.g. competitive remuneration and opportunities for career advancements through continuous development programs, fringe benefits, and by giving them an environment that is conducive to research and teaching *etc*.

Various facilities are provided to faculty to support them in conducting their duties e.g. laptops, individual rooms with wifi and internet facilities etc.

Standard 8.2 There must be an adequate number of high quality graduate students, research assistants and Ph.D. students.

There are 3 PhD students enrolled in the department with no research assistant. The number of graduate students during the last three years is 365. Faculty to graduate student's ratio for the last three years is 11.36:1

Standard 8.3 Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities.

8.3.1 Resources provided to library

Library at FAST NUCES Islamabad is equipped with updated and relevant resources. It possesses state of the art infrastructure. Currently, the library holds more than 60000 books for all programs. Library is organized to accommodate 200 students (male, female) in research cubicles as well as in the common places. Separate common rooms for male and female students are available with internet facility. Sufficient number of computers is available to be used by the students. Electronic equipment includes 24 PCs, 01 Printer, 01 Bar code reader, 01 CCTV

system, 02 Scanners, 01 Photocopier, 01 paper shredder, DVD/CD burner tower 01 etc. (See **Annex 17** for Library Details)

8.3.2 Resources provided to laboratories

Laboratories at FAST NUCES hold sufficient and high quality apparatus to facilitate students in their practical work. The university has the policy of open budget for laboratories i.e. necessary equipment with the approval of competent authority may be purchased as the demand generates. (See **Annexure 18** for laboratories equipment details)

8.3.3 Resources available for computing laboratories

Computing facilities at FAST NUCES are fully equipped with modernized infrastructure and systems. There are 09 computer laboratories in the University with about cumulatively 600 computers, except few specialized ones others are accessible to all students for their use.

Summary:

All eight criteria have been covered in the Self Assessment Report i.e.

- Program mission, vision, objective
- Curriculum design
- Laboratories and computing facilities
- Student support services
- Processes
- Faculty
- Institutional facilities
- Institutional support

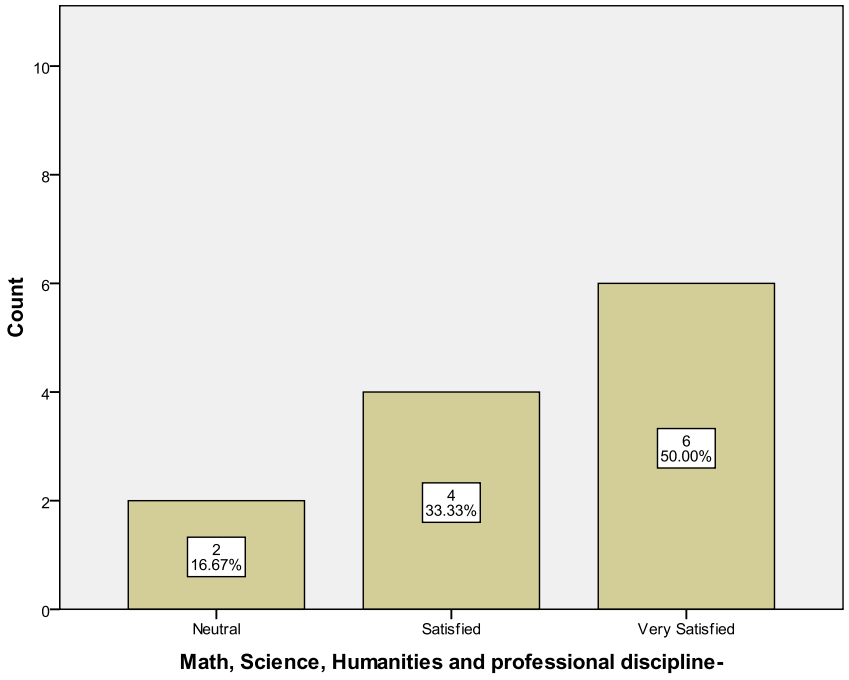
Different strengths and areas for improvements have been identified in the above criteria and standards. Some of the corrective actions have been taken and a few are under review by the management.

Annexure 1

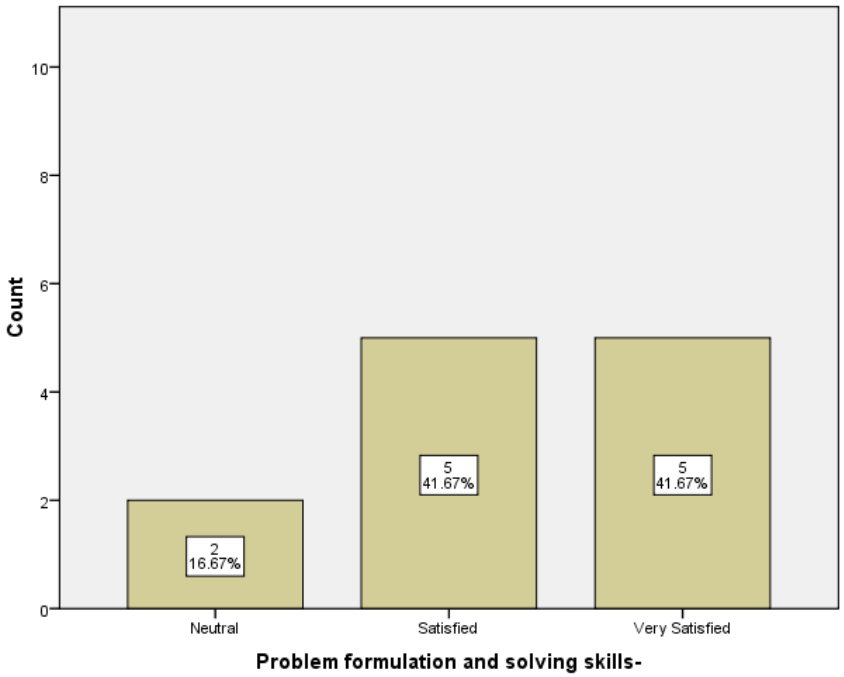
Employers Survey Results- School of Engineering

Annexure 1

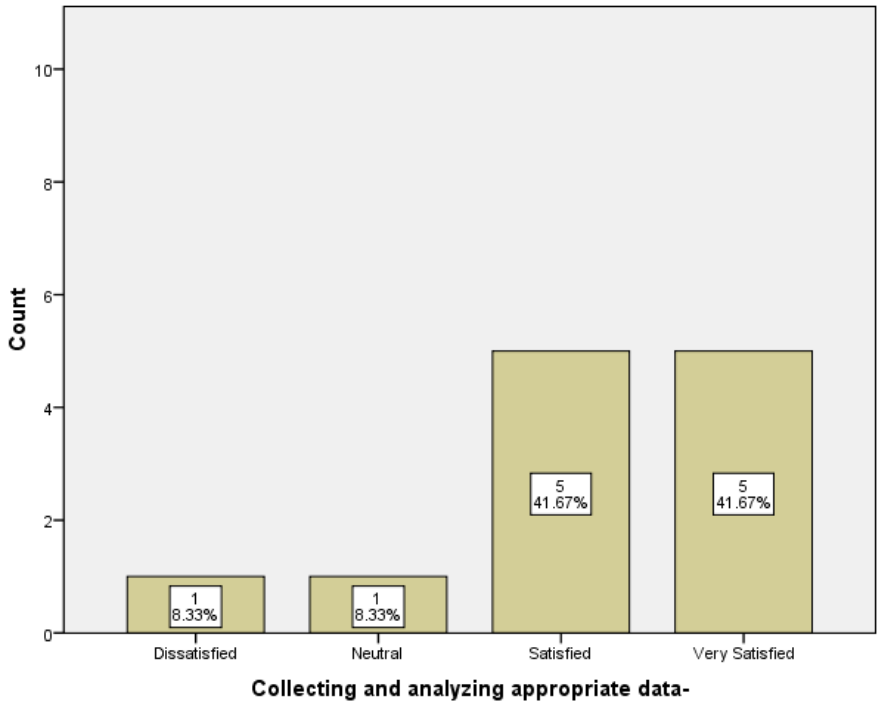
1. Knowledge

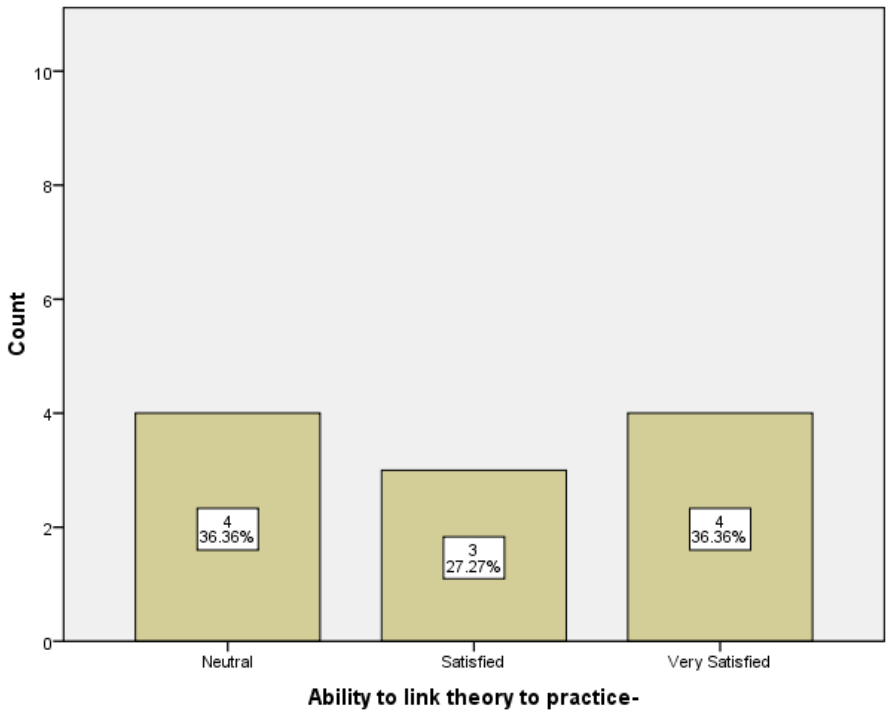


Math, Science, Humanities and professional discipline-



Problem formulation and solving skills-

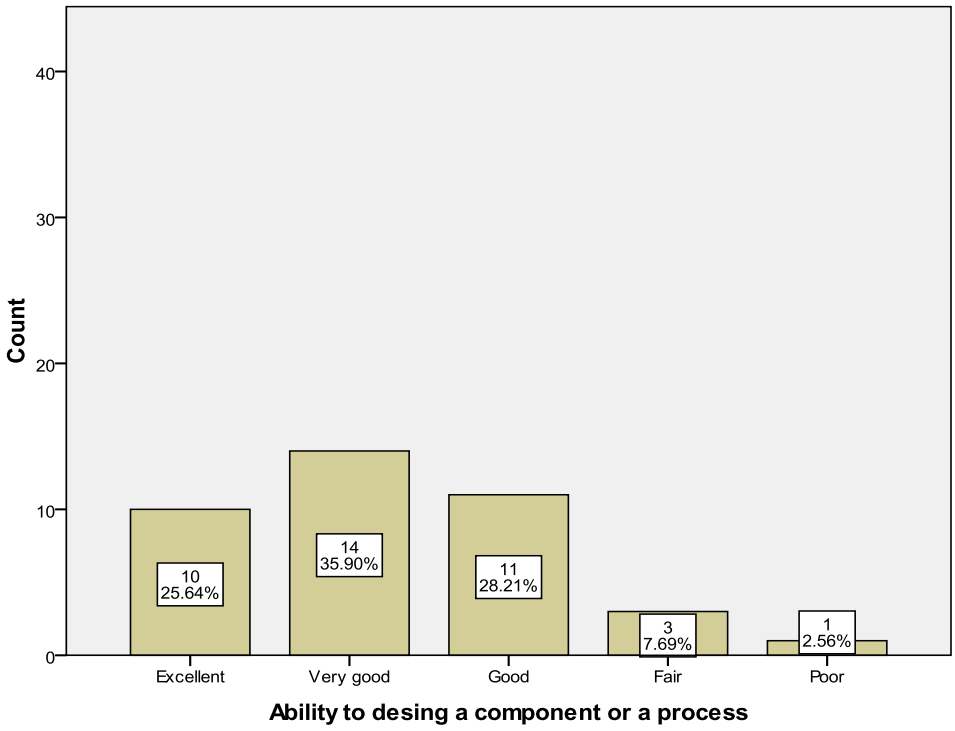

Count
10
8
6
4
2
0
1
8.33%
1
8.33%
5
41.67%
5
41.67%
Dissatisfied
Neutral
Satisfied
Very Satisfied
Collecting and analyzing appropriate data-

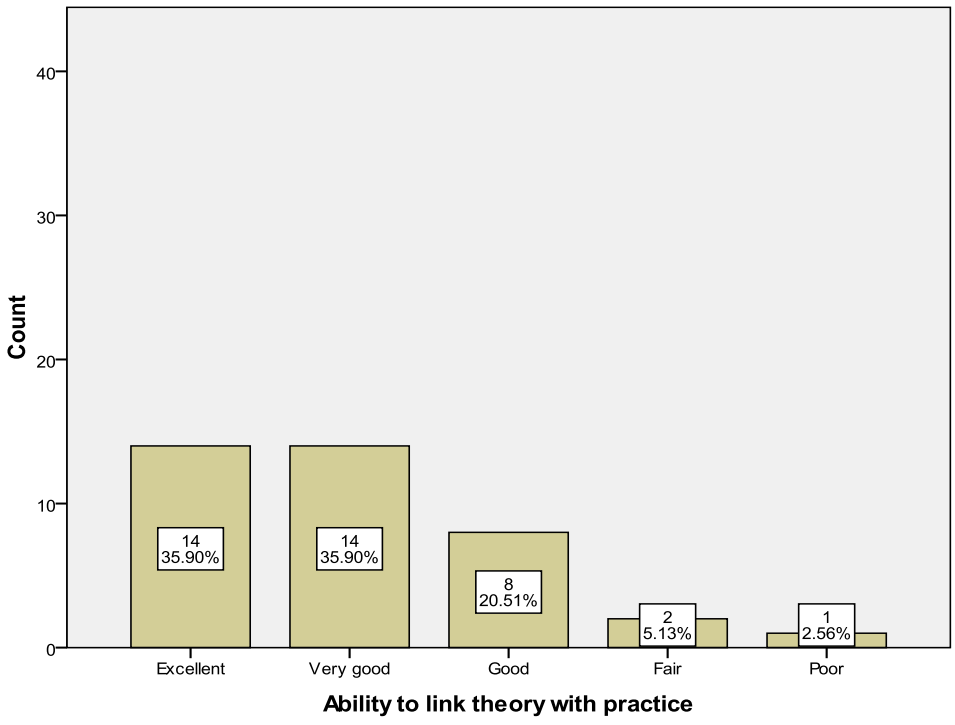

Count
10
8
6
4
2
0
4
36.36%
3
27.27%
4
36.36%
Neutral
Satisfied
Very Satisfied
Ability to link theory to practice-

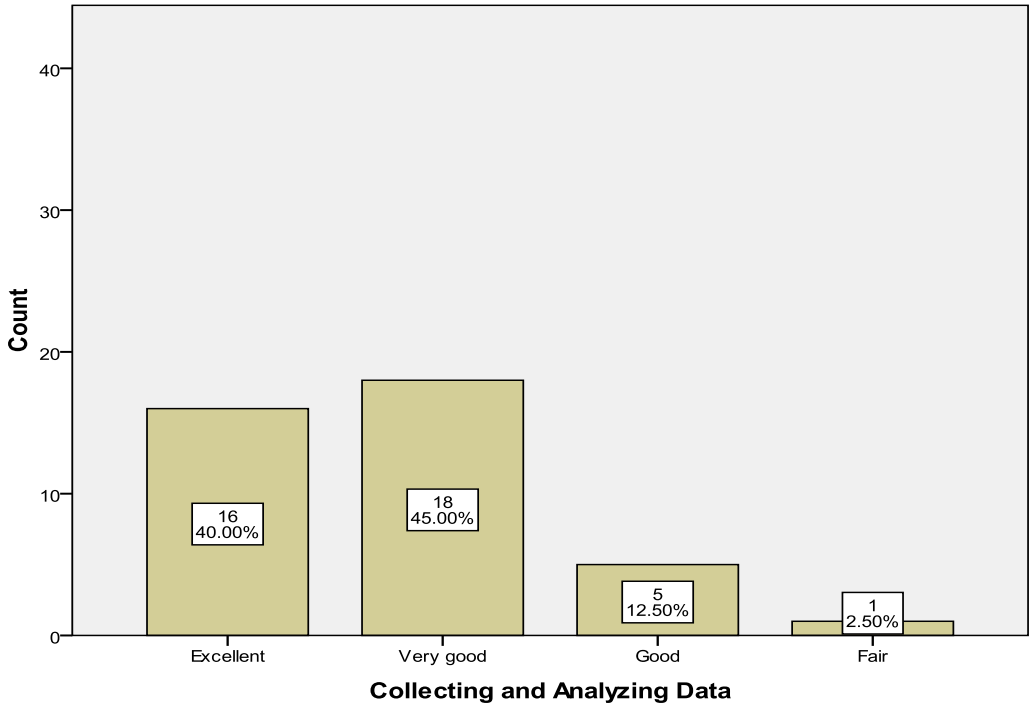
Annexure 2

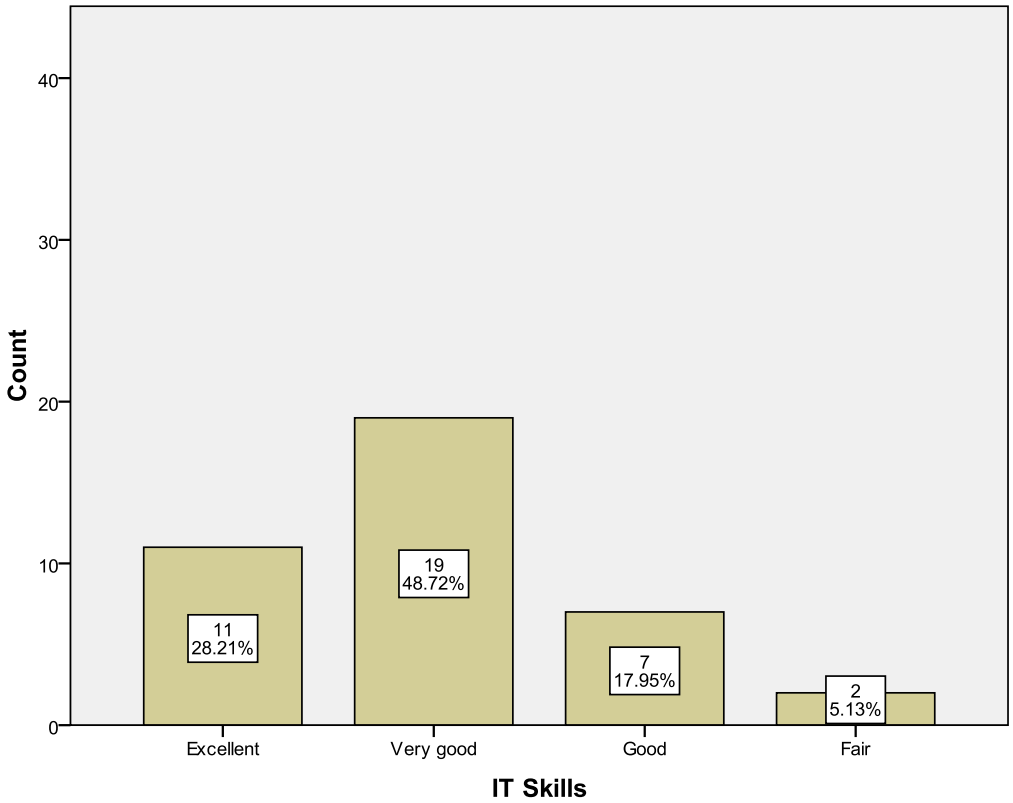
Annexure 2

Alumni Survey -Statistical Analysis






Count
40
30
20
10
0
16
40.00%
18
45.00%
5
12.50%
1
2.50%
Excellent
Very good
Good
Fair
Collecting and Analyzing Data

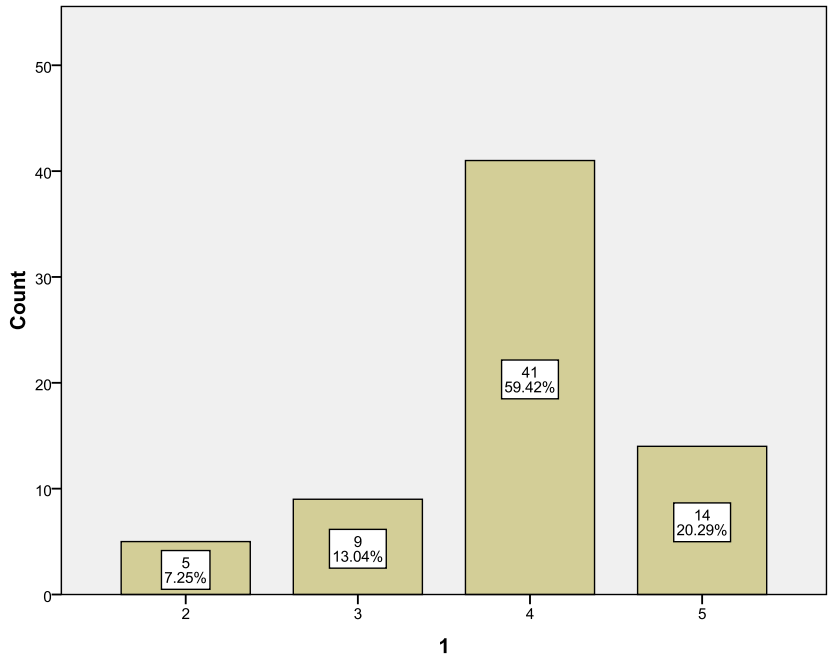

Count
40
30
20
10
0
11
28.21%
19
48.72%
7
17.95%
2
5.13%
Excellent
Very good
Good
Fair
IT Skills

Annexure 3

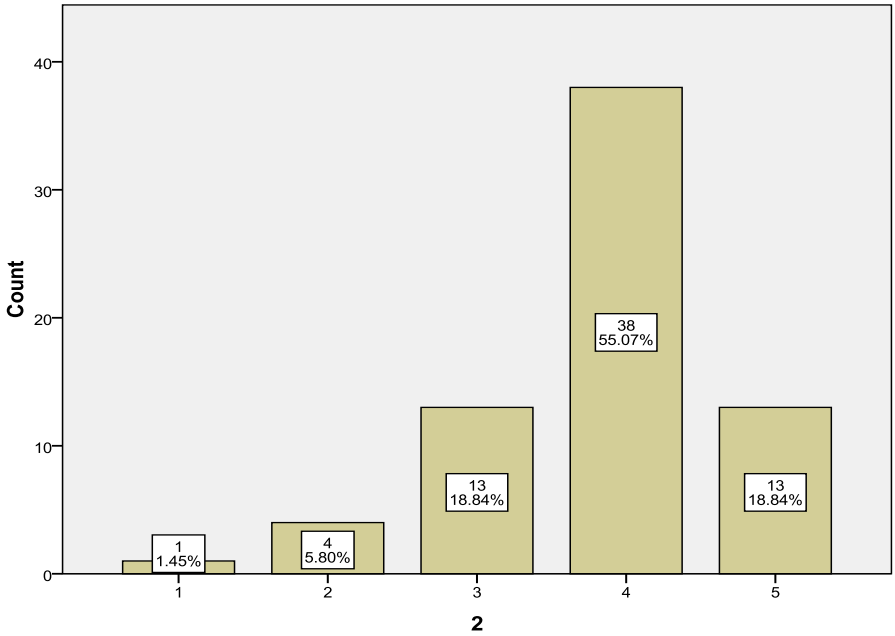
Survey of Graduating Students

Annexure 3

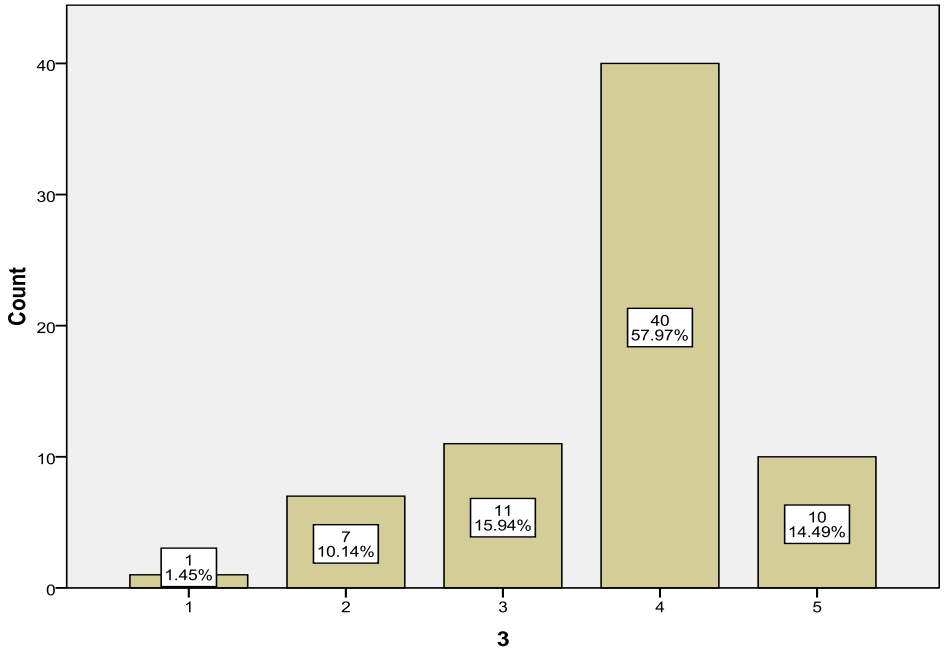
Q.1. Work in Program is Educative



Q.2. Program is effective in enhancing team-working abilities



Q.3. Program administration is effective in supporting learning



Annexure 4

Student Feedback Report by using HEC Proforma 1 and 10

Annexure 4

NUCES, Islamabad — NeON

Student Course Evaluation Analysis Report — Spring 2013

CS203-Dat

Instructor:

Registered Students: 43 — Date: 20-Sep-13 — Received Feedbacks: 42

4=Strongly Agree, 3=Agree, 2=Uncertain, 1=Dissatisfied, 0=Strongly Disagree — Rating Formula: Sum(Q.Wgt x Avg) / Sum(Q.Wgt)

Question	CGPA Range: 3.00 - 4.00 Responses / Total 14 / 11					CGPA Range: 2.00 - 2.99 27 / 31					CGPA Range: 0.00 - 1.99 1 / 2					Wt.	Avg.	Prod
	4	3	2	1	0	4	3	2	1	0	4	3	2	1	0			
Course Content and organization																		
1 The course objective was clear	3	1	2	1	1	12	3	3	1	2	1	.	.	.	.	1	3.77	3.77
2 The course workload was manageable	8	4	1	1	.	14	9	3	.	1	.	.	1	.	.	1	4.17	4.17
3 The course was well organized (e.g. timely access to materials, notification of changes, etc.)	3	2	1	1	1	2	13	1	2	3	.	1	.	.	.	1	3.43	3.43
Student Contribution																		
1 Did you actively participated in this course	.	1	6	1	6	.	3	10	1	13	.	.	.	1	.	1	1.74	1.74
2 Did you learn from this course	3	2	.	2	1	13	4	4	.	.	1	.	.	.	.	1	4.07	4.07
Learning Environment and Teaching methods																		
1 Was this course well structured to achieve the learning outcomes (there was a good balance of lectures, tutorials, practicals etc.)	7	4	2	1	.	14	10	3	.	.	.	.	1	.	.	1	4.17	4.17
2 Did the learning and teaching methods encouraged participation?	3	2	.	2	1	10	6	3	.	2	1	.	.	.	.	1	3.83	3.83
3 Was classroom environment conducive to learning?	7	4	2	1	.	14	8	4	.	1	.	.	.	1	.	1	4.05	4.05
4 Were classrooms satisfactory?	1	2	.	2	3	1	2	3	3	12	.	.	.	.	1	1	3.53	3.53
Learning Resources																		
1 Recommended reading books etc. were relevant and appropriate	3	2	2	7	.	8	1	4	14	.	.	.	1	.	.	1	2.93	2.93
2 Provision of learning resources in the library was adequate and appropriate (if relevant)	2	1	2	2	1	12	1	3	5	.	1	.	.	.	.	1	3.60	3.60
Quality of Delivery																		
1 The course stimulated my interest and thought in the subject area	5	1	2	6	.	17	.	1	8	1	.	.	1	.	.	1	3.60	3.60
2 Pace of the course was appropriate	2	1	1	3	1	10	1	3	5	2	1	.	.	.	.	1	3.33	3.33
3 Ideas and concepts were presented clearly	4	7	2	1	.	15	9	1	1	1	.	.	1	.	.	1	4.00	4.00
Instructor/TA evaluation																		
1 I understood the lectures	3	2	.	2	1	11	1	2	4	3	1	.	.	.	.	1	3.63	3.63
2 The instructor was responsive to student needs and problems	5	7	1	1	.	15	9	2	.	1	.	.	.	1	.	1	4.10	4.10
3 Had the instructor been regular throughout the course?	4	2	1	1	.	11	4	3	.	3	1	.	.	.	.	1	3.77	3.77
Tutorial																		
1 The material in the tutorials was useful	5	4	3	2	.	15	8	3	.	1	.	.	.	1	.	1	3.83	3.83
2 I was happy with the amount of work needed for tutorials	3	2	2	1	.	9	5	2	3	2	1	.	.	.	.	1	3.57	3.57
3 The tutor dealt effectively with my problems	6	4	3	1	.	15	9	2	.	1	.	.	.	1	.	1	3.98	3.98
Teacher Evaluation																		
1 The instructor is prepared for each class	3	2	1	2	.	12	4	2	1	2	1	.	.	.	.	1	4.03	4.03
2 The instructor demonstrates knowledge of the subject	5	6	2	1	.	16	8	2	.	1	.	1	.	.	.	1	4.29	4.29
3 The instructor has completed the whole course	5	1	1	1	.	11	4	5	.	1	1	.	.	.	.	1	4.20	4.20
4 The instructor provides additional material apart from the textbook	6	4	3	1	.	15	7	2	2	1	.	1	.	.	.	1	4.17	4.17
5 The instructor communicates the subject matter effectively	5	1	.	1	1	10	5	3	1	2	1	.	.	.	.	1	4.00	4.00
6 The instructor shows respect towards students and encourages class participation	6	3	4	1	.	16	8	2	1	.	.	1	.	.	.	1	4.29	4.29
7 The instructor arrived on time	6	1	.	1	.	13	3	3	.	2	1	.	.	.	.	1	4.30	4.30

8	The Instructor leftion time	5	4	4	1	.	18	8	1	.	.	.	.	1	.	.	1	4.36	4.36
9	The Instructor is fair in examination	5	2	.	1	.	14	2	2	.	3	1	.	.	.	.	1	4.23	4.23
10	The Instructor returned the graded scripts etc. in a reasonable amount of time	6	4	3	1	.	17	7	3	.	.	.	1	.	.	.	1	4.36	4.36
11	The Instructor was available during the specified office hours	5	1	1	1	.	12	4	3	1	1	1	.	.	.	.	1	4.23	4.23
12	The subject matter presented in the course has increased your knowledge of the subject	6	4	1	2	1	15	8	2	1	1	.	.	1	.	.	1	4.12	4.12
13	The assignments and exams covered the materials presented in the course	5	1	.	2	.	11	5	3	.	2	1	.	.	.	.	1	4.13	4.13
14	The course Material is modern and updated	6	5	2	1	.	14	10	2	1	.	.	.	.	1	.	1	4.24	4.24
																Total:	35		134.07
																Overall Rating:			76.61 %

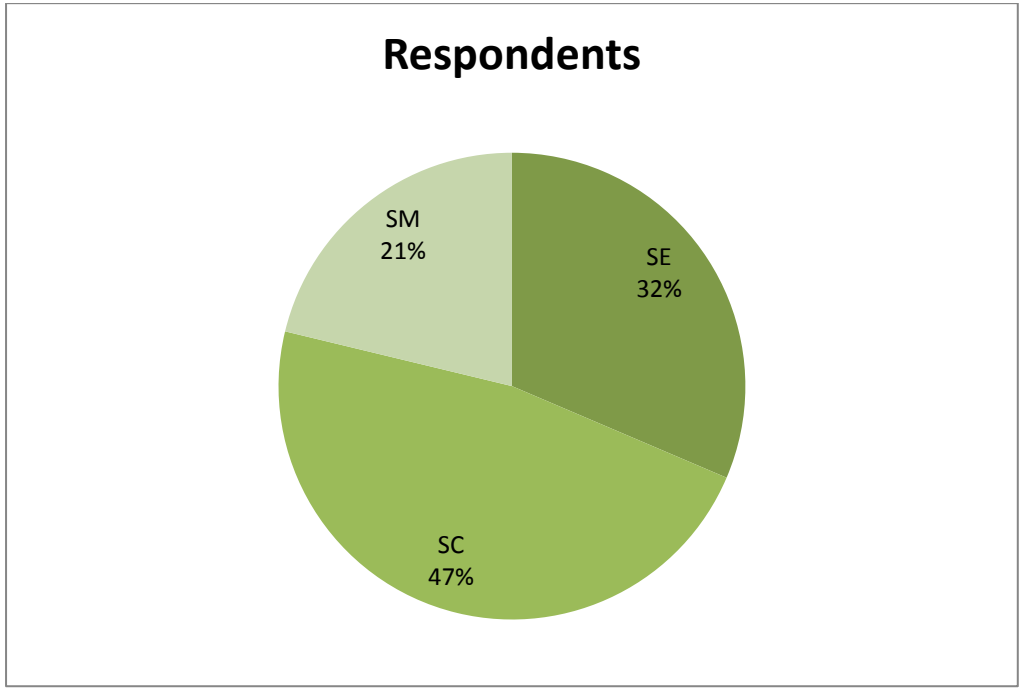
Annexure 5

Student Feedback (Consolidated Report)

1. Average Satisfaction Index:

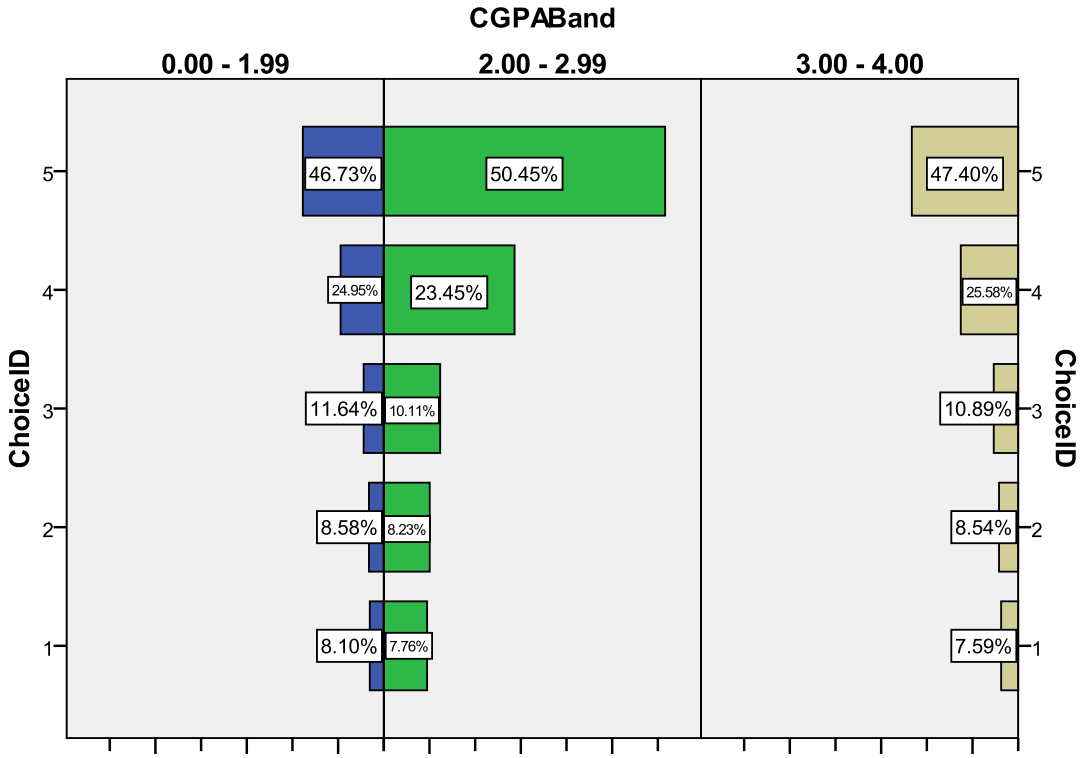
The average satisfaction index of the semester is 3.98/5.00 or 78.07%. The distribution is negatively skewed with value of -1.108.

2. Department wise respondents:



Maximum students are from Computer Science Department (47.35%); Then School of Engineering comes on the way with 31.42%. In the end School of Management stands with 21.23%.

3. CGPA Band and Choice ID Histograms



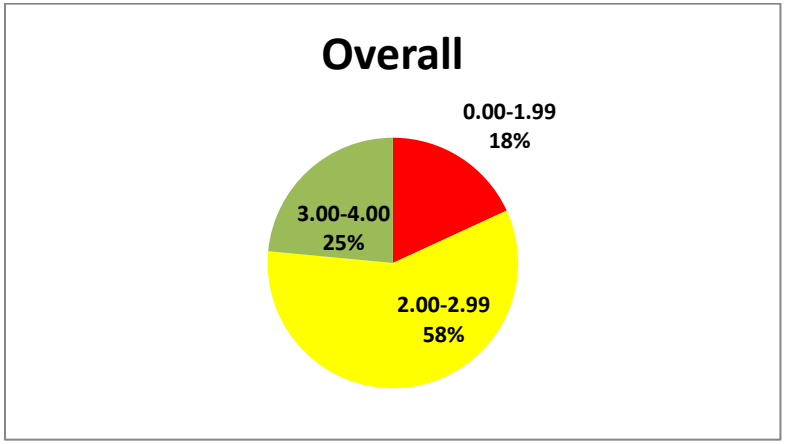
The histogram shows the distribution of choice IDs as per CGPA band of respondents.

4. CGPA wise Respondents

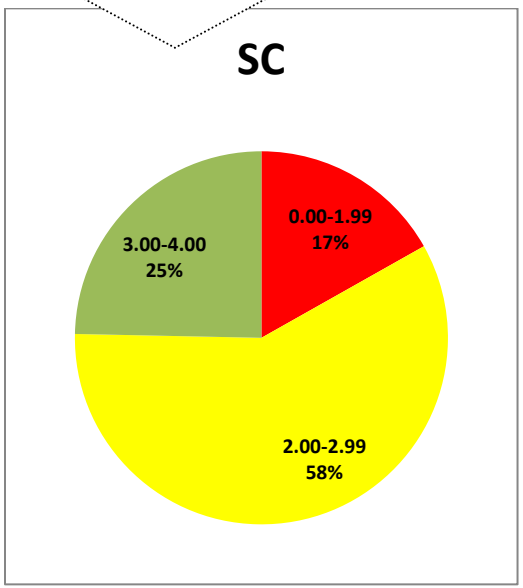
SC: 16.83% respondents are in band of 0.00-1.99 (This % is the lowest in the three schools).

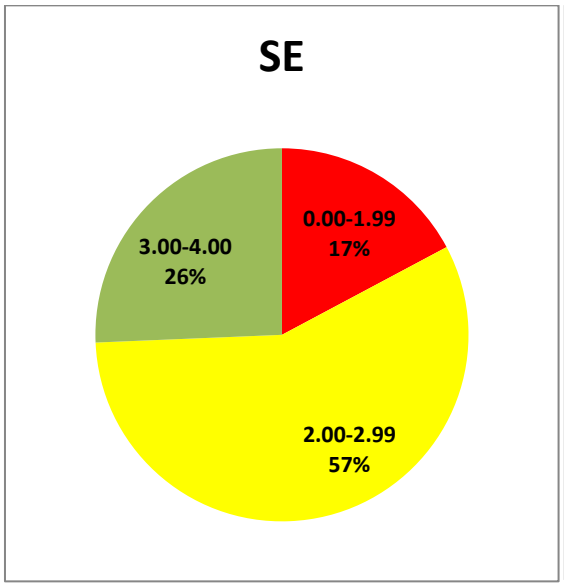
SE: 25.61% respondents are in band of 3.00-4.00 (this percentage is the highest in the three schools); 17.21% respondents are in the band of 0.00-1.99.

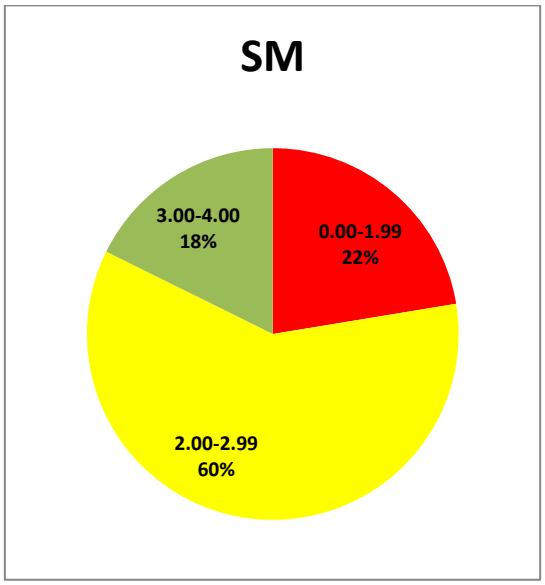
SM: 17.69% of the respondents are in the CGPA band of 3.00-4.00 (This % is the lowest in the three schools).



Most of the population i.e. 58.37% lies in the band of 2.00-2.99. Then the band of 3.00-4.00 comes with 23.5%. In the end the band of .00-1.99 stands with 18.13%.

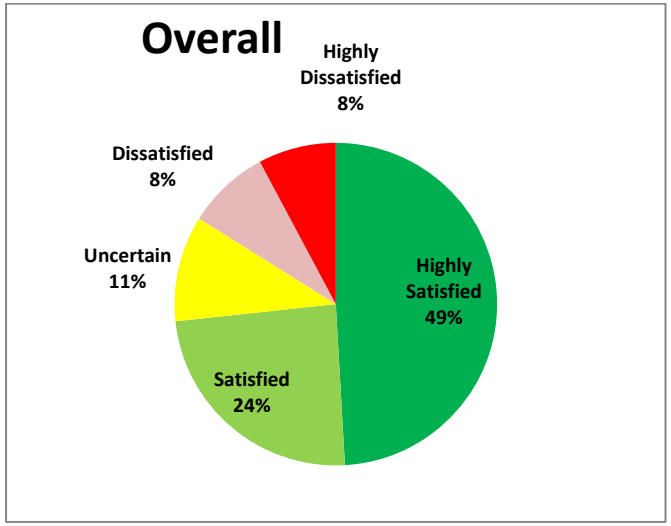




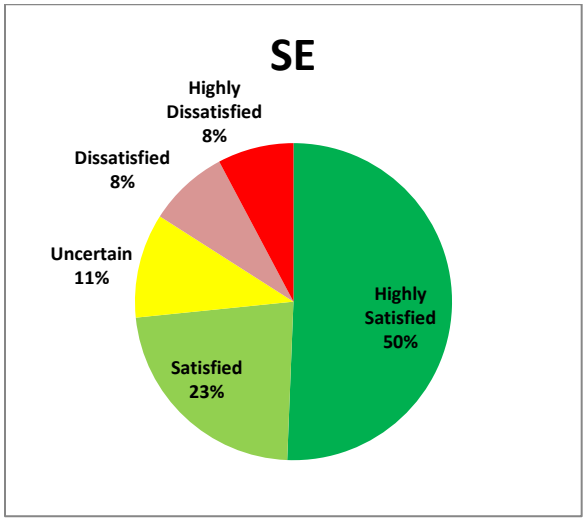


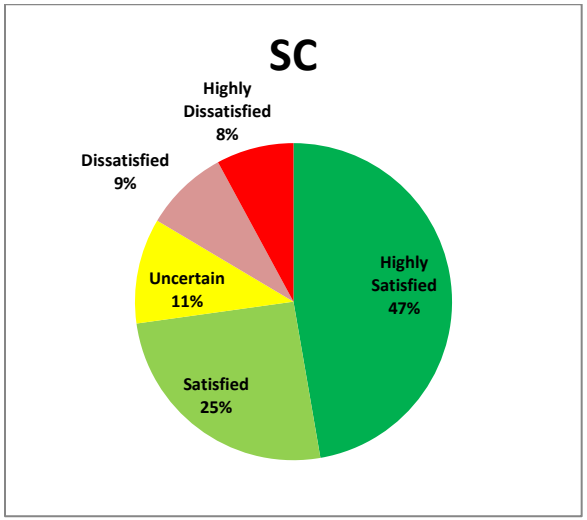
Satisfaction Index Distribution

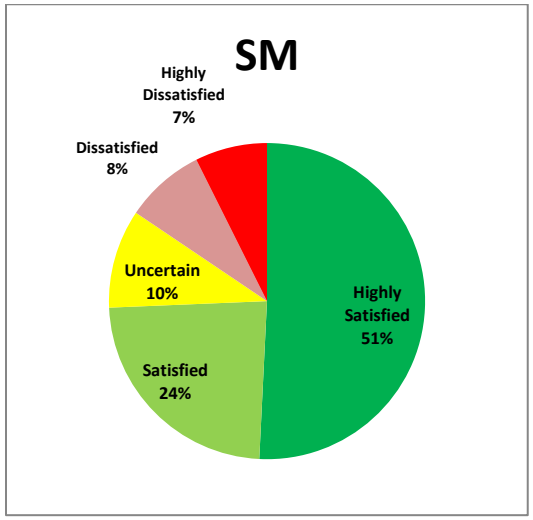
The distribution of satisfaction index in all schools is showing more or less a similar trend.



49% students are highly satisfied with the quality parameters of teaching in the campus. 24% students are satisfied. 11% students are uncertain. 8% students are dissatisfied. 8% students are highly dissatisfied with the quality of teaching in the campus.







5. Five Best Ranked Faculty with 10 or More Respondents – School of Engineering:

Serial #	Offered To Dept	Campus ID	Course ID	Name	Section	Teacher	Sem ID	Reg St	Rec FB	Rating	Faculty School
1	SE	ISB	EE105	Computer Logic Design	EE03A	Raza-Ur-Raheem	Spring 2013	28	28	88.99	SE
2	SE	ISB	EE302	Digital Signal Processing	EE08A	M. Ibrar Khan	Spring 2013	10	10	87.03	SE
3	SE	ISB	MG222	Engineering Economics	EE06B	Basharat Ahmad	Spring 2013	56	56	85.66	SE
4	SE	ISB	EE305	Electromagnetic Theory	EE05A	S. Abdullah Nauroze	Spring 2013	22	22	85.17	SE
5	SE	ISB	EE303	µP Interfacing & Programming	EE05A	Waqas Bin Abbas	Spring 2013	34	34	85	SE

For details please see annexure 1A.

6. Five Best Ranked Lab Engineers with 10 or More Respondents – School of Engineering:

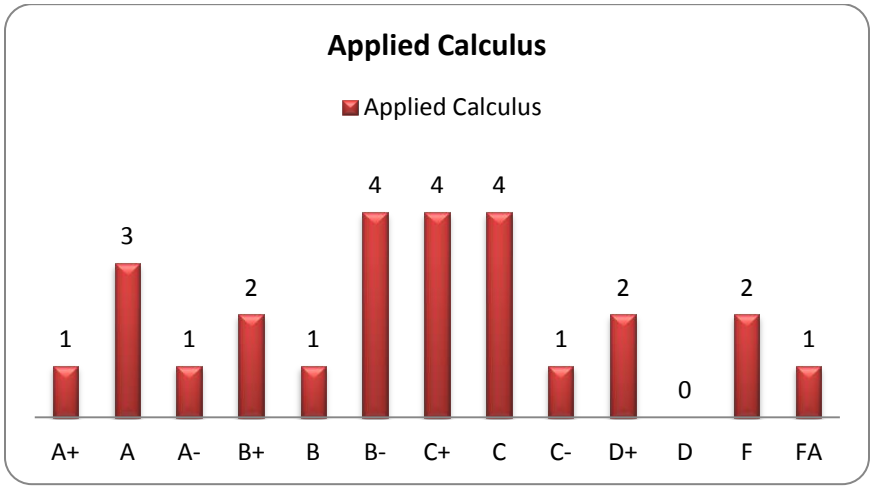
Serial #	Offered To Dept	Campus ID	Course ID	Name	Section	Teacher	Sem ID	Reg St	Rec FB	Rating	Faculty School
1	SE	ISB	EL112	Programming for Engineers - II Lab	EE05A	Hina Ashraf	Spring 2013	37	37	86.72	SE
2	SE	ISB	EL323	Analogue and Digital Communication - Lab	EE06C	Sana Hassan	Spring 2013	31	31	86.69	SE
3	SE	ISB	EL323	Analogue and Digital Communication - Lab	EE06A	Hira Masood	Spring 2013	30	30	84.88	SE
4	SE	ISB	EL302	Digital Signal Processing Lab	EE08A	Arshad Hassan Khan	Spring 2013	10	10	84.34	SE
5	SE	ISB	EL303	µP Interfacing & Programming Lab	EE05A	Shanullah	Spring 2013	31	31	84.23	SE

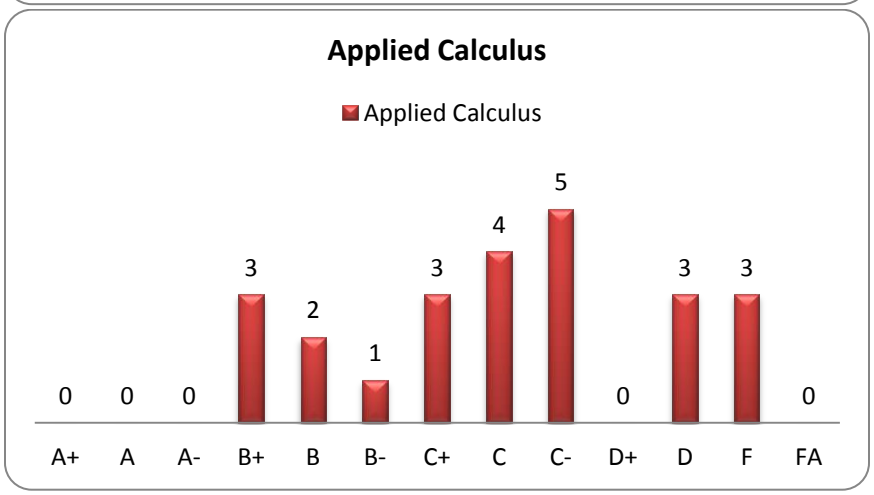
For details please see annexure 1B.

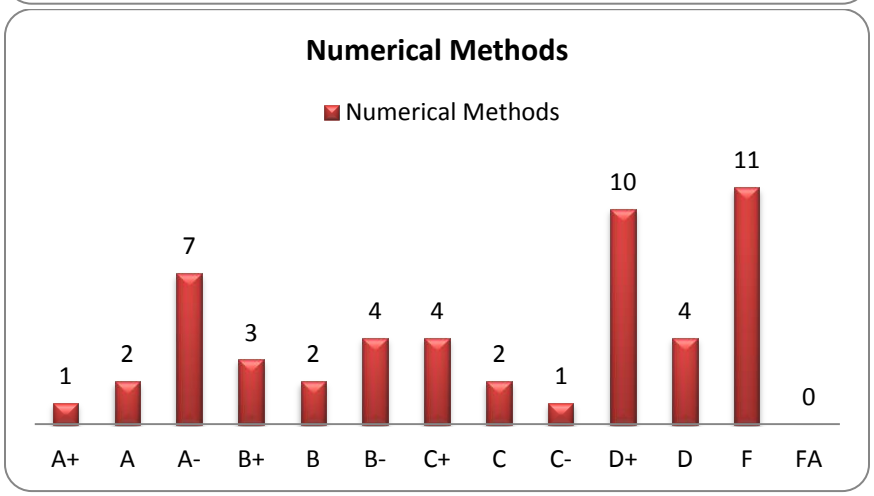
Annexure 6

Semester Performance Assessment Reports for faculty

Annexure 6



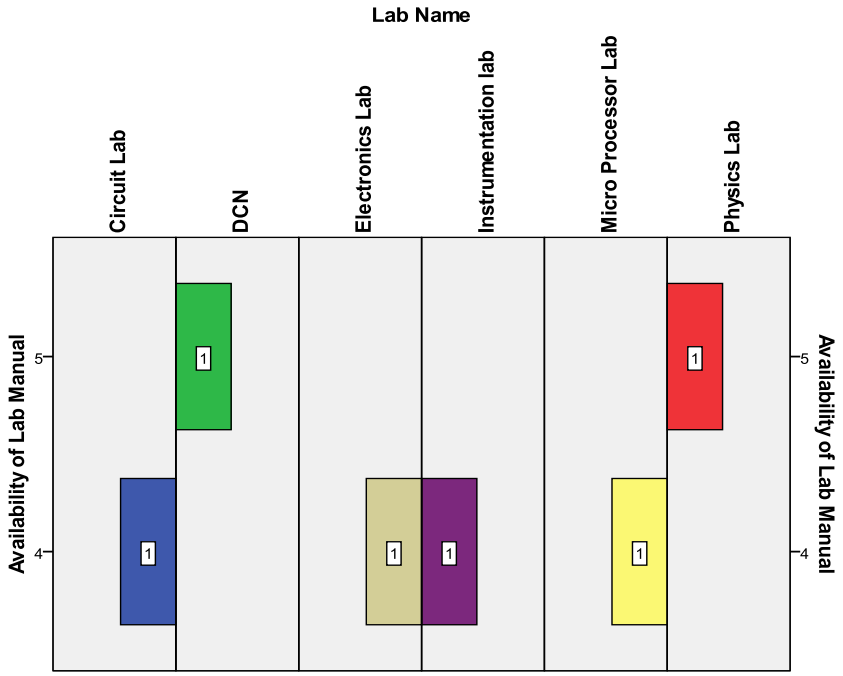


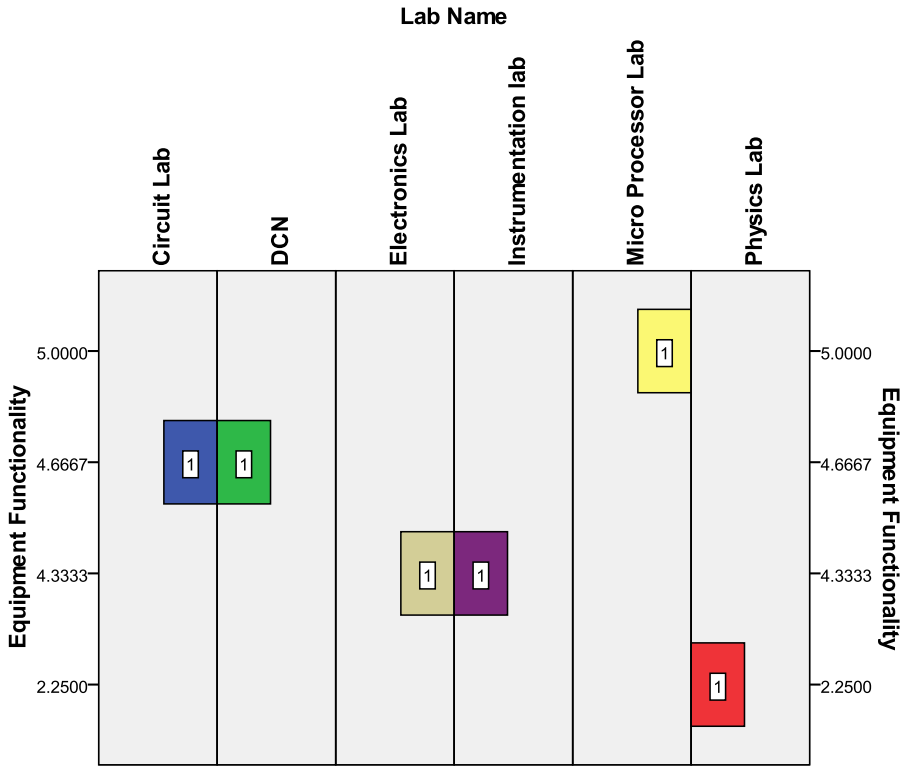


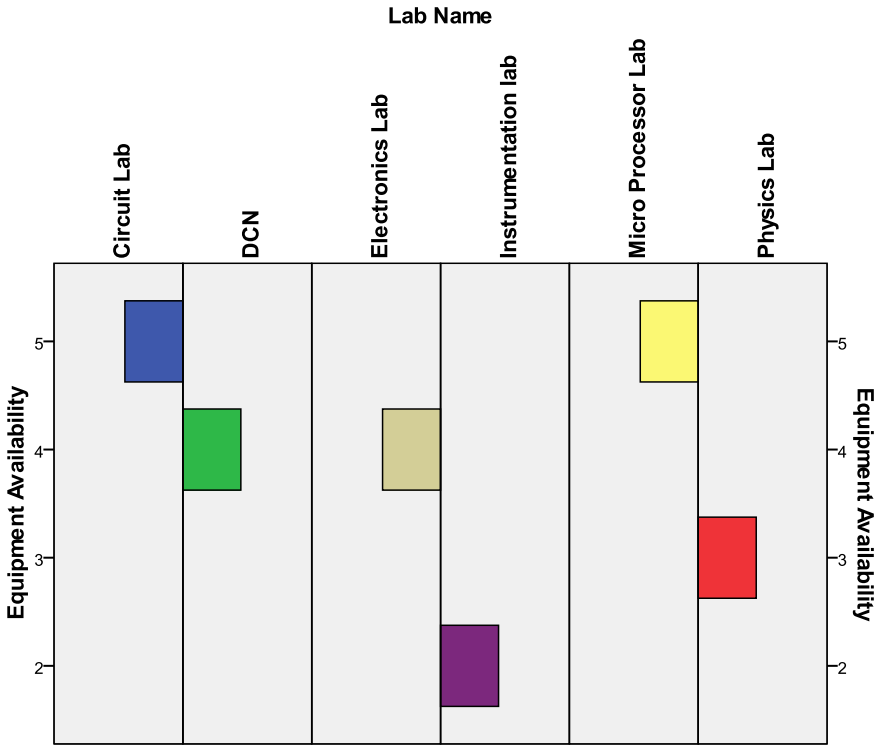
Annexure 7

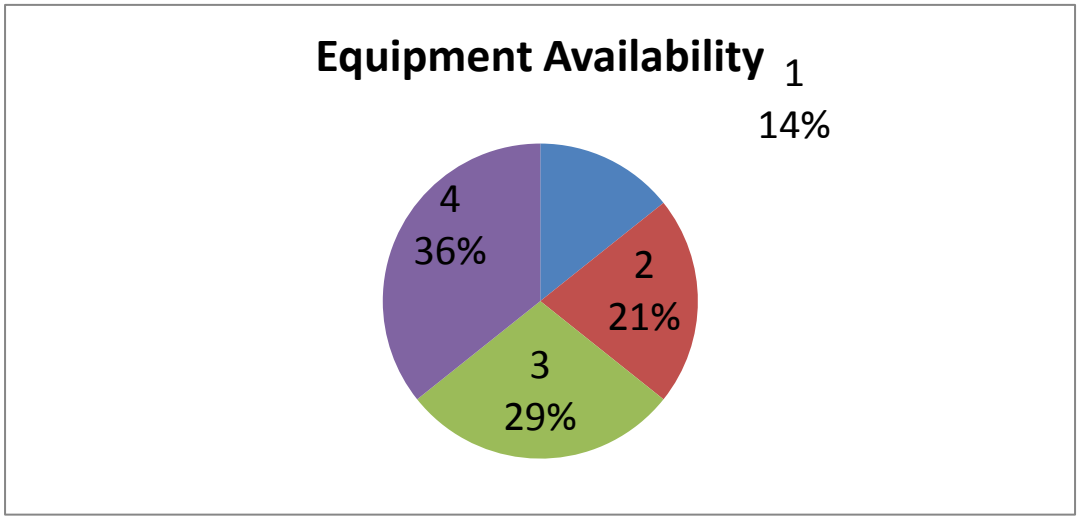
Lab Assessment Report

Annexure 7






Lab Name
Circuit Lab
DCN
Electronics Lab
Instrumentation lab
Micro Processor Lab
Physics Lab
Equipment Availability
5
4
3
2
Equipment Availability


Equipment Availability
1
14%
4
36%
2
21%
3
29%

Annexure 8

BS Electrical Engineering Study Plan

Annexure 8

First Year

Semester I

MT117	Applied Calculus	3
EE216	Circuit Analysis-I	3+1
EE110	Programming for Engineers- I	3+1
NS110	Physics for Engineers	3+1
SS101	English Language	3
	Total Credits	18

Semester II

EE112	Programming for Engineers- II	3+1
EE211	Engineering Workshop	1
EE217	Circuit Analysis II	3
MT104	Linear Algebra	3
MT203	Differential Equation	3
SS113	Pakistan Studies	3
	Total Credits	17

Second Year

Semester III

ME101	Basic Mechanical Engineering	3
EE105	Computer Logic Design	3+1
EE214	Electronics-I	3+1
ME102	Engineering Drawing	0+1
MT220	Complex Variable & Transforms	3
SS111	Islamic & Religious Studies	3
	Total Credits	18

Semester IV

EE206	Signal & Systems	3+1
EE221	Electro Mechanical Systems	3+1
MT319	Prob. & Random Processes	3
ME201	Applied Thermodynamics	3
MT207	Numerical Methods	3
	Total Credits	17

Third Year

Semester V

EE220	Instrumentation & Measurements	3+1
EE303	µP Interfacing & Programming	3+1
EE304	Feedback Control Systems	3+1
EE305	Electromagnetic Theory	3
EE408	Electrical Power Engineering	3
	Total Credits	18

Semester VI

EE322	CAD & Simulation	2+1
EE	EE Elective-I	3+1
EE	EE Elective-II	3+1
SS224	Technical Report Writing	3
MG22	Engineering Economics	3
	Total Credits	17

Third Year

Semester VII

EE482	Project-I	3
EE	EE Elective-III	3+1
EE	EE Elective-IV	3+1
MG330	Engineering Management	3
SS123	Communication Skills	3
	Total Credits	17

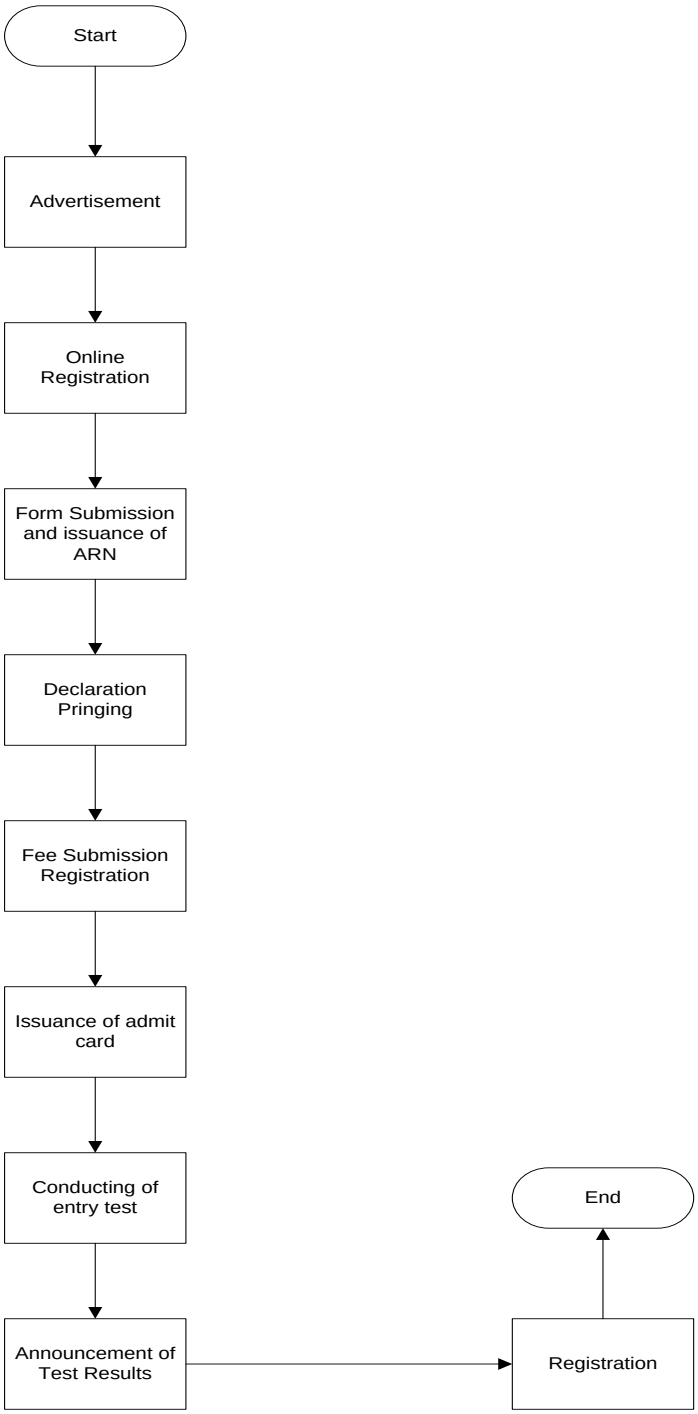
Semester VIII

EE483	Project -II	3
EE	EE Elective	3+1
SS145	Engineering Ethics	3
SS	Social Science Elcetive	3
	Total Credits	13

Total Credits 135

Annexure 9

Admission Process



Admission Process

Admissions are carried out by following strict measures for the quality intake at the FAST-NU

Admissions are advertised in daily national news papers of the country for all degree programs offer by FAST-NUCES in the months of May & June in a year.

The procedure/process for admission is as follows:

1. The Admission Application Form can be filled online by following the instructions.
2. The online system assigns a unique Application Reference Number (ARN) to each applicant, which must be noted for later use.
3. The applicant should then visit the campus, where the admission test is to be taken, along with the following:
   - Two recently taken (3 cm x 2 cm) color photographs
   - Copy of CNIC or Form-B issued by NADRA (National Database Registration Authority)
   - **Application processing fee of Rs 1,000** . This fee includes admission test fee for taking one test.
   - Additional Fee of Rs 500 is payable for each type of Admission Test. For example, for taking both the BBA and the BS tests, or for taking both the MS (CS) and MS (SPM) tests.
   - Required Educational Documents:
   - **For Undergraduate Admission:**
   - i) Original and copy of Matric/O-level Certificate.
   - ii) Original and copy of Intermediate/A-level Certificate or Roll number slip/statement of Entry for second year result awaiting students.
   - iii) Equivalence certificate of O/A Level.
   - **For Graduate Admission:**
   - i) Original and copy of all educational Certificates/Degrees.
4. The applicant will be required to sign a declaration confirming that the information provided in the Application Form by him/her is correct.

NU Online Admission Test

Information on various Admission Tests is available on the University's admission web-site **apply.nu.edu.pk**

The online admission test is taken on a computer. The candidate should be familiar with the use of mouse and the keyboard. Each candidate is given a different examination. The sections of a test (English, Analytical skills, Math etc) appear in a random sequence. Moreover, questions related to different topics also appear before the candidate in a random sequence. In each section, a candidate can move forward and backwards to review the responses selected. The candidate can change his or her response to any question within the current section.

Each section of the admission test has a fixed duration. Each section is timed independently and time saved in one section is not carried forward to the next sections. At the end of the test, a summary of the results is displayed on screen. The duration of the Online Admission Test is between two and three hours.

Applicants should reach the test centre on the date and time specified on the admit card. Latecomers will not be allowed to take the test. Applicants should not bring anything to the test centre except their Admit Cards. No applicant will be allowed to take the test without an endorsed Admit Card. The Admission Test is held at all campuses of the University (Karachi, Lahore, Islamabad, Faisalabad and Peshawar).

Selection Criteria

Selection is based on applicant's performance in the Admission Test.

Announcements of Selected Candidates

The selected candidates are informed through admission offer letters, SMS on their cell phones and also via email. The candidates should check the status of their admission from the University web site **apply.nu.edu.pk** or **www.nu.edu.pk**.

Securing Admission

The selected applicants will be required to complete all admission formalities by the specified date, failing which their offer of admission will stand cancelled. The vacancy shall then be filled by the next applicant in the merit list.

Confirmation of Admission

Admission allowed on the basis of Admission Test will be provisional, and shall be confirmed after receiving proof of qualifying the academic requirements including the passing of the examination.

If a selected applicant fails in the Intermediate (or equivalent examination), then admission of that student whose result was not announced at the time of admission shall immediately stand cancelled.

Cancellation of Admission

If a student is involved in any undesirable or illegal activity, then the University reserves the right to cancel the admission of that student. Moreover, the University reserves the right to cancel admission of any student at any time, if it is found that he/she has submitted false information/documents.

Foreign Nationals

At the time of admission, foreign nationals must submit a No Objection Certificate (NOC) from the Ministry of Education, Government of Pakistan.

GRE and SAT Examinations

Those who have taken SAT examination can apply for admission to the undergraduate programs, i.e. BBA or BS.

Those who have taken the GRE (subject test) can apply for admission to graduate programs, i.e. MS, MBA or PhD.

Eligibility Criteria
Under Graduate

Those who have taken the HSSC or an equivalent examination and are awaiting result are also eligible to apply. The four-year undergraduate programs of full time study are divided into eight semesters.

BS(Civil Engineering/Electrical Engineering)

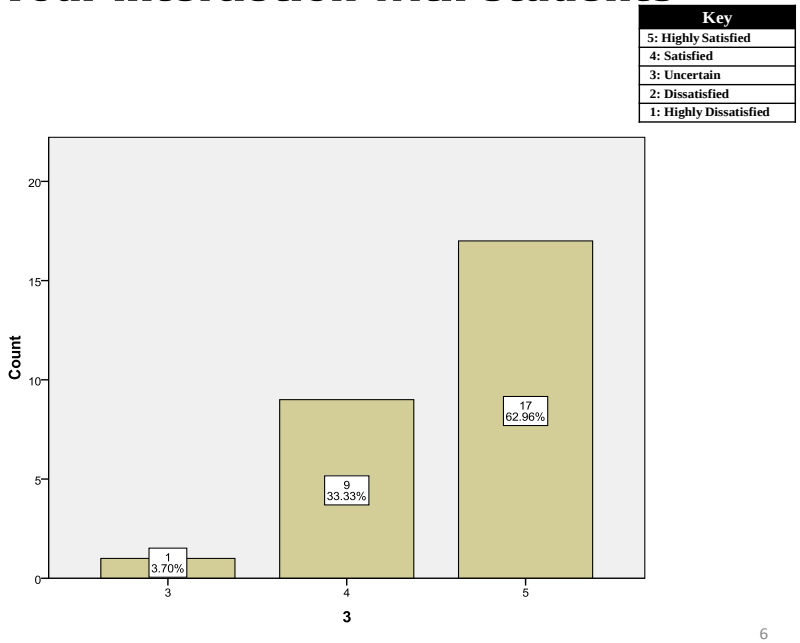
- **Eligibility**
  - - At least 60% marks in Matriculation or an equivalent examination **AND**
  - - At least 60% marks in HSSC (Pre-Engineering) or an equivalent examination.
- **Selection Criteria**
  - **Selection on the basis of NTS-NAT Marks**
  - - Those who have taken NAT-IE examination can apply for admission to the BS(Civil/Electrical) Engineering.
  - - Cut-off marks to be determined by the Admission Committee of the University.
  - **Selection on the basis of NU Admission Test**
  - - Merit is determined by assigning 30% weight to marks obtained in Intermediate (part-I) (or an equivalent exam).
  - - For those whose Intermediate results are not available, their Matriculation marks are considered.
  - - Marks obtained in the **NU Online Admission Test** are assigned the remaining 70% weight.
  - **Selection on the basis of SAT score**
  - - Combined score of 1,500 or more in the SAT-I examination **AND**
  - - At least 550 in the SAT-II (Math Level IIC) examination.

Annexure 10

Faculty Survey Report

Annexure 10

3. Your interaction with students



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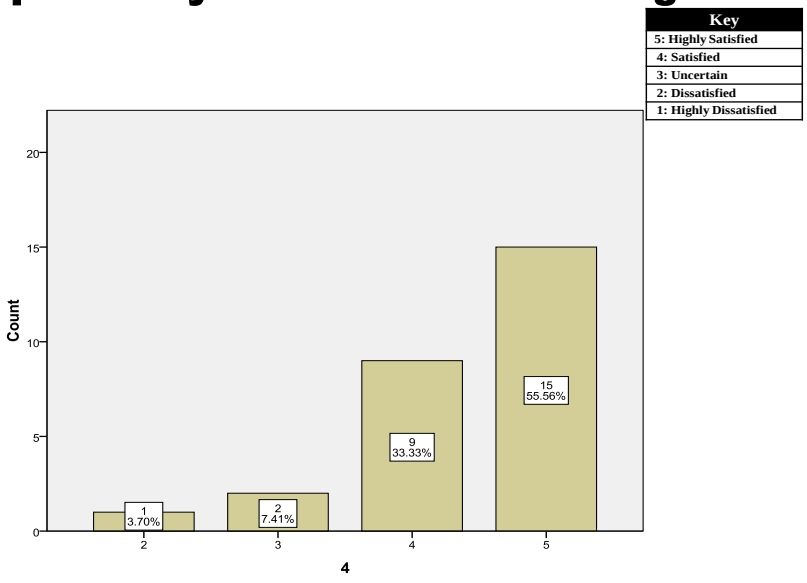
4. Cooperation you receive from colleagues



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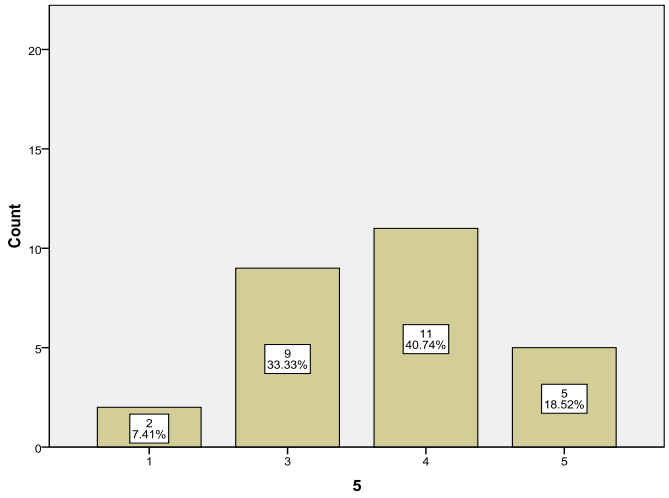
5. Mentoring available to you

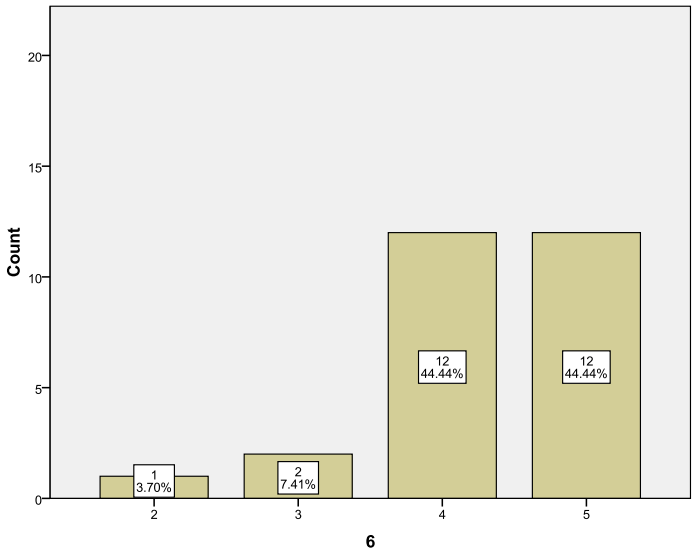
Key
5: Highly Satisfied
4: Satisfied
3: Uncertain
2: Dissatisfied
1: Highly Dissatisfied



8

6. Administrative support from the department

Key
5: Highly Satisfied
4: Satisfied
3: Uncertain
2: Dissatisfied
1: Highly Dissatisfied



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Annexure 11

Faculty Publications in Approved Journals

Annexure 11

Dr. Muddassar Farooq

1. Horst F. Wedde and Muddassar Farooq. BeeHive: Routing Algorithms Inspired by Honey Bee Behavior. K"unstliche Intelligenz.Schwerpunkt: Swarm Intelligence, 18--24, Nov 2005.
2. Horst F. Wedde and Muddassar Farooq. A Comprehensive Review of Nature Inspired Routing Algorithms for Fixed Telecommunication Networks. Elsevier Journal of System Architecture, Volume: 52 No: 8--9 August/September 2006. [Impact Factor = 0.7 \& Citations = 25]
3. Muhammad Saleem, Syed Ali Khayam, and Muddassar Farooq. On Performance Modeling of Ad Hoc Routing Protocols. EURASIP Journal of Wireless Communications and Networking, Hindawi Publishing Corporation, 2010, Article ID 373759, doi:10.1155/2010/3737592009. [Impact Factor = 0.7 \& Citations = 2]
4. Muhammad Saleem, Syed Ali Khayam, and Muddassar Farooq. On the Reliability of Ad Hoc Routing Protocols for Loss-and-Delay Sensitive Applications. Elsevier Journal Ad Hoc Networks, 2010, doi:10.1016/j.adhoc.2010.07.012. [Impact Factor = 1.6 \& Citations = 2]
5. Muhammed Saleem, Gianni Di Caro, and Muddassar Farooq. Swarm Intelligence Based Routing Protocols for Wireless Sensor Networks: Survey and Future Directions. Elsevier Journal of Information Sciences, 2010, doi:10.1016/j.ins.2010.07.005. [Impact Factor = 2.8 \& Citations = 2]
6. Farrukh Shahzad and Muddassar Farooq. ELF-Miner: Using Structural Knowledge and Data Mining for Detecting Linux Malicious Executables. In Springer Knowledge and Information Systems (KAIS). [Impact Factor = 2.0].
7. Nauman Mazhar and Muddassar Farooq. A Hybrid Artificial Immune System (AIS) Model for Power Aware Secure Mobile Ad Hoc Networks (MANETs) Routing Protocols. In Elsevier Journal of Applied Soft Computing (ASOC). [Impact Factor = 2.0]
8. Farrukh Shahzad and Muddassar Farooq. Mining Kernel Task Structure for Malware Analysis and Detection.} In Elsevier Journal of Information Sciences. [Impact Factor = 2.8]
9. M. Kamran and Muddassar Farooq. An Information-Preserving Watermarking Scheme for Right Protection of EMR Systems. In IEEE Transactions of Knowledge and Data Engineering. [Impact Factor = 2.2]

Dr. Shahzad Saleem

1. S. Saleem and C. Vogel, "Adaptive blind background calibration of polynomial-represented frequency response mismatches in a two-channel time-interleaved ADC" in IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 58, no. 6, June 2011, pp. 1300-1310

Dr. Ahsan Rahman

1. Saleem Khan, Yang Hoi Doh, Arshad Khan, Ahsan Rahman, K.H. Choi, Dong Soo Kim "Direct Patterning and Electrospray Deposition through EHD for fabrication of Printed Thin Film Transistors" (2011) Current Applied Physics (ISSN: 1567-1739) Vol:11 pp:S271-S279 (Journal) HEC Recognized:Yes
2. Kyung H Choi, Ahsan Rahman, J B Kho, Asif Rehmani, Adnan Ali, Y H Doh, D.S. Kim "Development and Ejection Behavior of Different Material Based Electrostatic Inkjet Heads " (2010) International Journal of Advanced Manufacturing Technology (ISSN:0268-3768) Vol:48 pp:165-173 (Journal) HEC Recognized:Yes

3. K.H. Choi, Adnan Ali, Ahsan Rahman, Nauman Malik Mohammad, D.S.Kim "Electrode Configuration Effects on Electrification and Voltage Variation in Electrostatic Inkjet Printing Head" (2010) Journal of Micromechanics and Micro engineering (ISSN: 0960-1317) Vol:7 pp:- (Journal) HEC Recognized:Yes
4. Ahsan Rahman, Adnan Ali, Khalid Rahman, Hyung Chan Kim, Yang Hoi Doh, D.S.Kim, K. H. Choi "Influence of Electrode Position and Electrostatic Forces on the Generation of Meniscus in Dielectric Ink" (2010) Japanese Journal of Applied Physics (ISSN:0021-4922) Vol:49 pp:05EC02-1 -05EC02-8 (Journal) HEC Recognized:Yes

Dr. Affan A. Syed

1. Affan A. Syed, John Heidemann, and Wei Ye." Tones for Real: Managing Multipath in Underwater Acoustic Wakeup." ACM Transaction on Sensor Networks (TOSN), under review.
2. Affan A. Syed, Wei Ye, and John Heidemann." Comparison and Evaluation of the T-Lohi MAC for Underwater Acoustic Sensor Networks." IEEE Journal of Selected Areas in Communication, V. 26 (N. 12), Pages 1731-1743, December, 2008.
3. Joon Ahn, Affan Syed, Bhaskar Krishnamachari, and John Heidemann, "Design and Analysis of a Propagation Delay Tolerant ALOHA Protocol for Underwater Networks". Elsevier AD HOC NETWORKS Journal, 2010.

Dr. Rashad Ramzan

1. Rashad Ramzan, Naveed Ahsan, Jerzy Dabrowski, and Christer Svensson "A 0.5-6GHz Low Gain RF Front-End for Low-IF Over-Sampling Receivers in 90nm CMOS ", Under Review
2. Naveed Ahsan, Christer Svensson, Rashad Ramzan, Jerzy Dabrowski, Aziz Ouacha, and Carl Samuelsson "A 1.1V, 6.2mW, Highly Linear Wideband RF Front-end for Multistandard Receivers in 90nm CMOS ", Journal of Analog Integrated Circuits and Signal Processing, Springer 2011 online, DOI 10.1007/s10470-011-9667-9. (JCR Impact Factor: 0.591 (2008), 0.452 (2010)
3. Rashad Ramzan, Jonas Fritzin, Jerzy Dabrowski, and Christer Svensson "Wideband Low Reflection Transmission Lines for Bare Chip on Multilayer PCB", Electronics and Telecommunications Research Institute (ETRI) Journal, vol.33, no.3, June 2011, pp.335-343. DOI:10.4218/etrij.11.0110.0386, (JCR Impact Factor: 1.1 (2008), 0.912 (2010))
4. Rashad Ramzan, Naveed Ahsan, Jerzy Dabrowski "A 0.9-5.6 GHz on-Chip Stimulus Generator for Gain, Linearity, and Blocking Profile Test of Wideband RF Front-ends", IEEE Transactions on Measurement and Instrumentation, VOL. 59, NO. 11, NOVEMBER 2010 (published on-line 2009), D.O.I: 10.1109/TIM.2009.2036454 , (JCR Impact Factor: 0.978 (2008) 1.098 (2010)
5. Jerzy Dabrowski and Rashad Ramzan "Built-in Loopback Test for IC RF Transceivers", IEEE Transaction on Very Large Scale Integrated (VLSI) Systems (TVLSI), Nov-2009 , Vol. 18, June-2010, pp. 933 - 946, D.O.I: 10.1109/TVLSI.2009.2019085 (JCR Impact Factor: 1.373 (2008) 0.904 (2010)
6. Rashad Ramzan, Stefan Andersson, Jerzy Dabrowski, and Christer Svensson "Multiband RF-Sampling Receiver Front-End with On-Chip Testability in 0.13µm CMOS" Journal of Analog Integrated Circuits and Signal Processing, Springer -2009, Vol.61, pp: 115-127, D.O.I: 10.1007/s10470-009-9286-x. (JCR Impact Factor: 0.591 (2008) 0.452 (2010)
7. Rashad Ramzan and Jerzy Dabrowski "CMOS blocks for on-chip RF test", Journal of Analog Integrated Circuits and Signal Processing, Springer 2006, Vol.49, pp. 151-160, D.O.I: 10.1007/s10470-006-9615-2. (JCR Impact Factor: 0.591 (2008) 0.452 (2010)

Dr. Qasim Zeeshan

1. Q. Z. Ahmed and L.-L. Yang "Reduced-rank adaptive multiuser detection in hybrid direct-sequence time-hopping ultrawide bandwidth systems", IEEE Trans. Wireless Commun., vol. 9, no. 1, pp.156 - 167 , 2010. 2.152 (2010)
2. Ahmed, Q.Z., Lie-Liang Yang, Sheng Chen, "Reduced-Rank Adaptive Least Bit-Error-Rate Detection in Hybrid Direct-Sequence Time-Hopping Ultrawide Bandwidth Systems", Vehicular Technology, IEEE Transactions on, On page(s): 849 - 857, Volume: 60 Issue: 3, March 2011. 1.485 (2010)

HEC approved PhD supervisors		
S.No	**Name**	**Impact Factor**
1	Dr. Muddassar Farooq	14.67
2	Dr. Rashad Ramzan	4.27
3	Dr. Qasim Zeeshan	3.63
4	Dr. Affan A. Syed	6.00
5	Dr. Ahsan Rahman	6.10
6	Dr. Shahzad Saleem	1.42

Annexure 12

Faculty Course Review Report

(To be filled by each teacher at the time of Course Completion)

For completion by the course instructor and transmission to Head of Department of his/her nominee (Dept. Quality Officer)

Department:	Electrical Engineering		Faculty:	Sana Hassan, Shehzad Ahmad
Course Code:	EE 323	Title:	Analog and Digital Communication	

Overview/Evaluation (Course Co-coordinator's Comments)

Feedback: first summarize, and then comment on feedback received from:

(These boxes will expand as you type in your answer.)

1) Student (Course Evaluation) Questionnaires

Students are satisfied with the course contents, organization, learning environment and teaching methods. But the students have few concerns regarding some topics in course book "Modern Digital and Analog communication systems by B.P Lathi"

Secondly in students' point of view, merging the analog and digital communication contents into a single four month semester has made the course lengthy and cumbersome for most of the students.

In students' point of view, the pace of course was bit fast because of large course contents. University should separate these two courses so that students can understand the basic concepts of analog and digital communication in a better way.

Students are satisfied with the quality of teaching but in this particular course the strength of the classes was above forty. That really caused the some problems for both teachers and students.

2) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines

The analog and digital communication course that is being taught at undergraduate level is highly significant. The course contents recommended by HEC and those taught in our university are same. But it is quite difficult for the students to grasp the concepts of two different fields (Analog and Digital Communication) in a single four month course.

3) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)

Assessment is just based on few hour examinations, but students learn a lot during class through whole semester. Sometimes under exam pressure the students may not perform very well, which in turn causes so much frustration and disappointment in students as well as in teachers. There should be viva type exam before final examination. Secondly, exams should be based on short conceptual questions besides the numerical ones. So that the concepts of the students can be assessed clearly rather than just assessing their numerical solving skills under time and exams pressure.

4) Enhancement: comment on the implementation of changes proposed in earlier

Faculty Course Review Reports

NA

5) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt

Digital Communication course contents should be covered from "Digital Communications: Fundamentals and Applications" by Bernard Sklar which is not mentioned in HEC curriculum.

Teaching of the basic concepts of Bandpass and Baseband modulation and demodulation in digital communication part of the course is quite enough at undergraduate level. In depth details of Delta modulation, ASK, PSK, FSK, QPSK, MFSK etc should be covered in a separate digital communication course.

Name: Sana Hassan / Shehzad Ahmad Date: 25-11-13

(Course Instructor)

Name: _____ Date: _____

(Head of Department)

Annexure 13

Faculty Development and Career Planning

Annexure 13

Details of conferences/workshops attended by faculty for Capacity Development & Skill Enhancement

Sr. No.	Name	Desig.	Event	Duration	Amount (Rs.)	Date of Approval
1.	Engr. Rashid Karim	Lecturer	Advanced Training on "Integrated Circuits Design" held at NIE, Islamabad	1 Week	10,000/-	Feb 04, 13
2.	Engr. Shawkat Ali	Lecturer	Advanced Training on "Integrated Circuits Design" held at NIE, Islamabad	1 Week	10,000/-	Feb 04, 13
3.	Engr. Azhar Rauf	Asst. Prof	Online workshop on "IRP Proposal Writing" conducted by Institute of Research Promotion	2 Days	3,500/-	Jan 10, 13
4.	Dr. Muddassar Farooq	Professor	Workshop on "Wireless Communication" held at UET, Taxila	4 Days	1,000/-	Dec 31, 12
5.	Dr. Muhammad Saeed	Asst. Prof	Workshop on "Wireless Communication" held at UET, Taxila	4 Days	1,000/-	Dec 31, 12
6.	Engr. Shahzad Ahmed	Lecturer	Workshop on "Wireless Communication" held at UET, Taxila	4 Days	1,000/-	Dec 31, 12
7.	Engr. Arshad Hassan	Lecturer	Workshop on "Wireless Communication" held at UET, Taxila	4 Days	1,000/-	Dec 31, 12
8.	Engr. Hina Ashraf	Lab Engr.	Workshop on "Wireless Communication" held at UET, Taxila	4 Days	1,000/-	Dec 31, 12
9.	Engr. Riwana Shahar Bano	Lab Engr.	Workshop on "Wireless Communication" held at UET, Taxila	4 Days	1,000/-	Dec 31, 12
10.	Engr. Rao Munzir	Lab Engr.	Workshop on "Wireless Communication" held at UET, Taxila	4 Days	1,000/-	Dec 31, 12
11..	Dr. Muddassar Farooq	Professor	Training Course on "Innovation and Entrepreneurship" held at COMSTECH, Islamabad.	5 Days	5000/-	Nov 12, 12
12.	Dr. Muhammad Saeed	Asst. Prof	Training on "Total Quality Management" Pakistan Engineering	1 Day	2000/-	Oct 15, 12

			Council			
13.	Engr. Aamer Hafeez	Asst. Prof	Training on "Total Quality Management" Pakistan Engineering Council	1 Day	2000/-	Oct 15, 12
14.	Dr. Muddassar Farooq	Professor	Commonwealth Secretariat's Conference on "M-government and its Role in Bringing Citizens Closer to Government in Pakistan" M/O Economic Affairs & Statistics (Economic Affairs Division)	2 Days	Nil	Oct 08, 12
15.	Engr. Azhar Rauf	Asst. Prof	Workshop on "Advance Excel" by Inovative Consultants	2 Days	10000/-	Jun 06, 12
16.	Engr. Kashif Siddiq	Asst. Prof	Workshop on "Sensor & Instrumentation Electronics" LUMS	7 Days	2000/-	Jun 01, 12
17.	Engr. Kashif Siddiq	Asst. Prof	Workshop on "National Laboratory Immersion Program" LUMS	7 Days	2000/-	Jun 01, 12
18.	Dr. Muddassar Farooq	Professor	Workshop on "Green Economy" held at COMSTECH, Islamabad.	3 Days	2000/-	May 16, 12
19.	Engr. Kashif Siddiq	Asst. Prof	Training Course on "Academic Research and Writing Training Workshop" Held at Skill Development Council, Islamabad.	3 Days	15000/-	Mar 12, 12
20.	Engr. Shibli Nisar	Asst. Prof	Training Course on "Academic Research and Writing Training Workshop" Held at Skill Development Council, Islamabad.	3 Days	15000/-	Mar 12, 12
21.	Dr. Muddassar Farooq	Professor	Training Course on "Innovation and Future Studies for Sustainable Development" held at COMSTECH, Islamabad.	5 Days	5000/-	Mar 05, 12
22.	Dr. Muddassar Farooq	Professor	Training Course on "Leadership and Governance" at National School of Public Policy (NSPP), Lahore.	5 Days	30000/-	Feb 06, 12
23.	Engr. Aamer Hafeez	Asst. Prof	Workshop on 4th Generation Core Network Infrastructure (EPC/SAE/LTE) at MAJU, Islamabad.	2 Days	10000/-	Feb 03, 12

24.	Dr. Muddassar Farooq	Professor	3rd International eHealth Conference held at University of Health Sciences	2 Days	3500/-	Jan 21, 12
25.	Engr. Aamer Hafeez	Asst. Prof	Workshop on "RF Power Amplifier (PA) Design" LUMS	2 Days	6600/-	Jan 17, 12
26.	Engr. Kashif Siddiq	Asst. Prof	Workshop on "RF Power Amplifier (PA) Design" LUMS	2 Days	6600/-	Jan 17, 12
27.	Engr. Rao Munzir	Lecturer	Workshop on "RF Power Amplifier (PA) Design" LUMS	2 Days	6600/-	Jan 17, 12
28.	Engr. Shawkat Ali	Lecturer	Workshop on "RF Power Amplifier (PA) Design" LUMS	2 Days	6600/-	Jan 17, 12
29.	Engr. Shanullah	Lab Engr.	Workshop on "RF Power Amplifier (PA) Design" LUMS	2 Days	6600/-	Jan 17, 12
30.	Engr. Rizwana Shaher Bano	Lab Engr.	Workshop on "RF Power Amplifier (PA) Design" LUMS	2 Days	6600/-	Jan 17, 12
31.	Engr. Hina Ashraf	Lab Engr.	Workshop on "RF Power Amplifier (PA) Design" LUMS	2 Days	6600/-	Jan 17, 12
32.	Dr. Affan A. Syed	Asst. Prof	"Workshop on Design and Development of Embedded Systems Using Programmable System-on-chip (PSoC)" NUST-SEECS	1 Day	4000/-	Dec 20, 11
33.	Engr. Rao Munzir Ahmed	Lecturer	"Wokshop on Design and Development of Embedded Systems Using Programmable System-on-chip (PSoC)" NUST-SEECS	1 Day	4000/-	Dec 20, 11
34.	Dr. Muddassar Farooq	Professor	Training Course on "Foresight for Innovation"	5 Days	10000/-	Nov 28, 11
35.	Engr. Azhar Rauf	Asst. Prof	Developing a Researcher Workshop "Research Center for Training & Development (RCTD)" at Lahore	2 Days	Nil	Nov 23, 11
36.	Engr. Farooq Hussain	Asst. Prof	CPD Short Course " Project Procurement and Contract Management"	1 Day	2000/-	Nov 21, 11
37.	Dr. Muddassar	Professor	Training Course on "Intellectual	3 Days	5000/-	Oct 31, 11

	Farooq		Property Rights (IPRs) and Technology			
38.	Engr. Farooq Hussain	Asst. Prof	Interactive Workshop on CPD-Framework for Professional Development of Engineers.	1 Day	Nil	Oct 24, 11
39.	Engr. Kashif Siddiq	Asst. Prof	Electronic Design & Semi Conductor Devices by Dr. Asad A. Abidi LUMS, Lahore	8 Days	Nil	Jul 14, 11
40.	Engr. Rao Munzir	Lecturer	Electronic Design & Semi Conductor Devices by Dr. Asad A. Abidi LUMS, Lahore	8 Days	Nil	Jul 14, 11
41.	Engr. M Zeeshan Naseer	Lab Engr.	Electronic Design & Semi Conductor Devices by Dr. Asad A. Abidi LUMS, Lahore	8 Days	Nil	Jul 14, 11
42.	Dr. Ahsan Rahman	Asst. Prof	Solar Electricity Installation by Skill Development Council, Islamabad	1 Day	8000/-	May 19, 11
43.	Rizawana Shaher Bano	Lab Engr.	Labview Workshop by Millitary College of Signals, Rawalpindi	2 Days	3000/-	Apr 23, 11
44.	M Rashid Karim	Lab Engr.	Labview Workshop by Millitary College of Signals, Rawalpindi	2 Days	3000/-	Apr 23, 11
45.	Dr. Muddassar Farooq	Professor	TiEConference, Lahore	1 Days	3500/-	Oct 30, 11
46.	Musasser Awan	Lab Engr	Management Consultants and Trainers, on Strategic Vision by Time Lenders	3 Days	78000/-	Oct 22,11
47.	Adnan Sahid	Lecturer	UTMS/WCDMA Technology Training with introduction n to HSDPA and HSUPA by QUALCOMM &Iqra University, Islamabad	2 Days	2000/-	Apr 26, 10
48.	M Shahid Qureshi	Asst. Prof	UTMS/WCDMA Technology Training with introduction n to HSDPA and HSUPA by QUALCOMM &Iqra University, Islamabad	2 Days	2000/-	Apr 26, 10
49.	Dr. Ahsan Rahman	Asst. Prof	3rd International Scientific Spring, NCP, QAU, Islamabad	4 days	500/-	Mar 01, 11

50.	Dr. Muddassar Farooq	Professor	Workshop on "Strategic Vision" by Timelenders.	3 Day	19500/-	Mar 22, 10
51.	Syed Ahmar Qamar	Lecturer	Survey Design and Samplin Techniques, COMSATS Lahore	1 Day	2500/-	Mar 06, 10
52.	Saleem Aslam	Lecturer	Workshop on "Fundamentals of WIMAX". COMSATS, Islamabad.	1 Day	2000/-	Feb 6, 10
53.	Najam Ul Hassan	Lecturer	Workshop on "Fundamentals of WIMAX". COMSATS, Islamabad.	1 Day	2000/-	Feb 6, 10
54.	Saleem Aslam	Lecturer	Workshop on "Publishing Your Research". Institute of Research Promotion LHR.	1 Day	2500/-	Jan 29, 10
55.	Najam Ul Hassan	Lecturer	Workshop on "Publishing Your Research". Institute of Research Promotion LHR.	1 Day	2500/-	Jan 29, 10
56.	Azhar Rauf	Asst. Prof.	Workshop on "Development Literature Review". Institute of Research Promotion LHR.	1 Day	2500/-	Jan 01, 10

Annexure 14

Safety Policy

FAST School of Engineering Laboratories

FAST School of engineering is committed to provide, promote and maitain safe working environment for its students, staff, and faculty. The School requires its students, staff, and faculty to adhere to Safety Policy. The policy is presented under the heads of General & Basic Laboratory Safety Rules/guidelines for the School of Engineering laboratories.

I. General Laboratory Safety Rules:

1. Food, drink, and related utensils shall not be brought into, stored in or consumed in a laboratory.
2. Appropriate costumes should be worn. Avoid bulky and loose clothes.
3. In case of emergency, lab engineer/lab assistant should be contacted (Ext. 223)
4. Shoes shall be worn that provide full coverage of the feet.
5. Labs should only be used for lab work.
6. Labs should be used in presence of authorized person i.e. lab engineer/lab asisstant.
7. All safety rules should be observed in their true spirit.

II. Basic Electrical Safety Guidelines:

The School of Engineering requires everyone who uses electrical equipment to understand these safety precautions which are presented under the heads of safe working practices, checklist for avoiding unsafe conditions, and electricity emergency response.

A. Safe Work Practices

This section highlights the safe working practices under the categories of equipment handling, circuits, power supply cords, and soldering:

Equipment Handling:

1. Don’t remove the protective cover of an equipment to replace a part, adjust or troubleshoot. Ask a qualified person to do the work
2. Only use DRY hands and tools and stand on a DRY surface when using electrical equipment, plugging in an electric cord, etc.
3. Never put conductive metal objects into energized equipment.
4. Always pick up and carry portable equipment by the handle and/or base. Carrying equipment by the cord damages the cord's insulation.
5. Heed the warning signs, barricades and/or guards that are posted when equipment or wiring is being repaired or installed or if electrical components are exposed.
6. Do not run wires over moving or rotating equipment, or on the floor, or string them across walkways from bench-to-bench.

7. Equipment found to be faulty in any way should be reported immediately and not used until it is inspected and declared safe.

Circuit:

1. If you are working with a circuit that will be connected to an external power supply, **turn the power switch of the external supply OFF** before you begin work on the circuit.
2. When using large electrolytic capacitors be sure to wait long enough (approximately five time constants) for the capacitors to discharge before working on the circuit.
3. Check circuit power supply voltages for proper value and for type (DC, AC, frequency) before energizing the circuit.

Power supply:

1. Don't use an electrical outlet or switch if the protective cover is ajar, cracked or missing.
2. Volatages above 50Vrms AC and 50 V DC are always dangerous. Extra precautions should be considered as volatage levels are increased.
3. Connect to the power source **LAST.**
4. If you are working with a lab kit that has internal power supplies, **turn the main power switch OFF** before you begin work on the circuits. Wait a few seconds for power supply capacitors to discharge. These steps will also help prevent damage to circuits.
5. All conducting surfaces intended to be at ground potential should be connected together.

Cords:

1. Unplug cords from electrical outlets by pulling on the plug instead of pulling on the cord.
2. Use extension cords temporarily. The cord should be appropriately rated for the job.
3. Use extension cords with 3 prong plugs to ensure that equipment is grounded.
4. Never remove the grounding post from a 3 prong plug so you can plug it into a 2 prong, wall outlet or extension cord.
5. Re-route electrical cords or extension cords so they aren't run across the floor, under rugs or through doorways, etc. Stepping on, pinching or rolling over a cord will break down the insulation and will create shock and fire hazards.
6. Don't overload extension cords, multi-outlet strips and wall outlets.
7. Discard damaged cords, cords that become hot, or cords with exposed wiring.

Soldering:

1. The most obvious risk of soldering is that of a burn from the hot iron or solder. There is also the risk of electric shock if the soldering equipment has a damaged lead or defective wiring. Always check the lead and plug for damage before starting work and take care not to rest the iron on the lead and burn it. The experiments should be carried out in well ventilated area to minimize the inhalation of the fumes.

B. Checklist for avoiding Unsafe Conditions (either before or while you're using equipment)

Following checklist should be used by the lab users before performing any experiment:

Serial #	Aspects	Yes	No
1	Is the cord's insulation frayed, cracked or damaged, exposing the internal wiring?		
2	Are the plug's prongs bent, broken or missing, especially the third prong?		
3	Is the plug or outlet blackened by arcing?		
4	Was liquid spilled on or around the equipment?		
5	Are any protective parts (or covers) broken, cracked or missing?		
6	Do you feel a slight shock when you use the equipment?		
7	Does the equipment or the cord overheat when it is running?		
8	Does the equipment spark when it is plugged in or when switches or controls are used?		

C. If you observe any of these unsafe conditions:

1. Don't use (or stop using) the equipment.
2. Immediately report the problem to the Lab Instructor or person In-charge of the lab.
3. Learn and know how to respond in an emergency

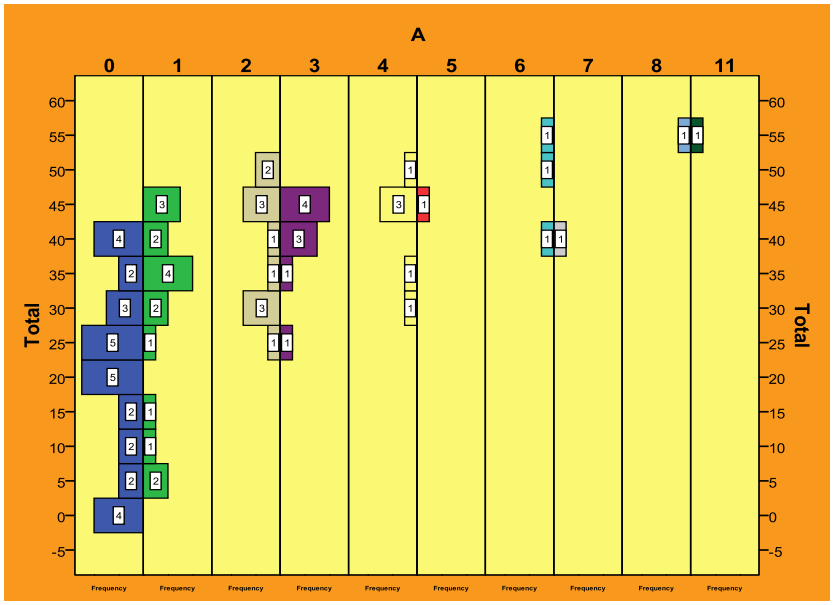
D. Electrical Emergency Respone:

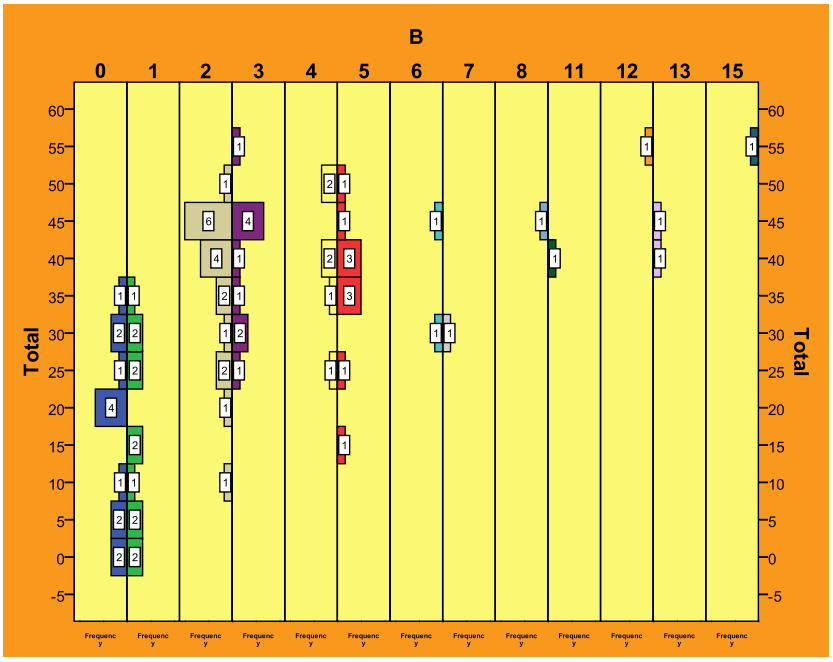
1. Electric Shock: If the victim is still in contact with the electrical current, immediately turn off the electrical power source.
2. Electrical Fire: Try to disconnect the electrical power source, if possible.

Annexure 15

Periodic Semester Assessment Report Annexure 15

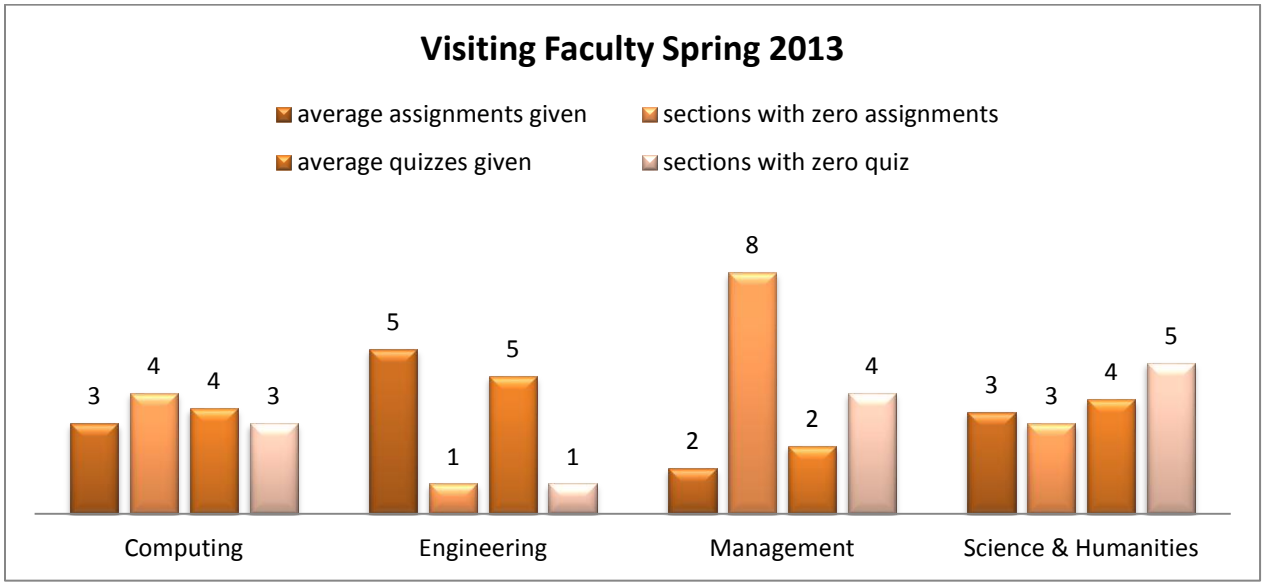
Grading Trend Analysis (Consolidated)

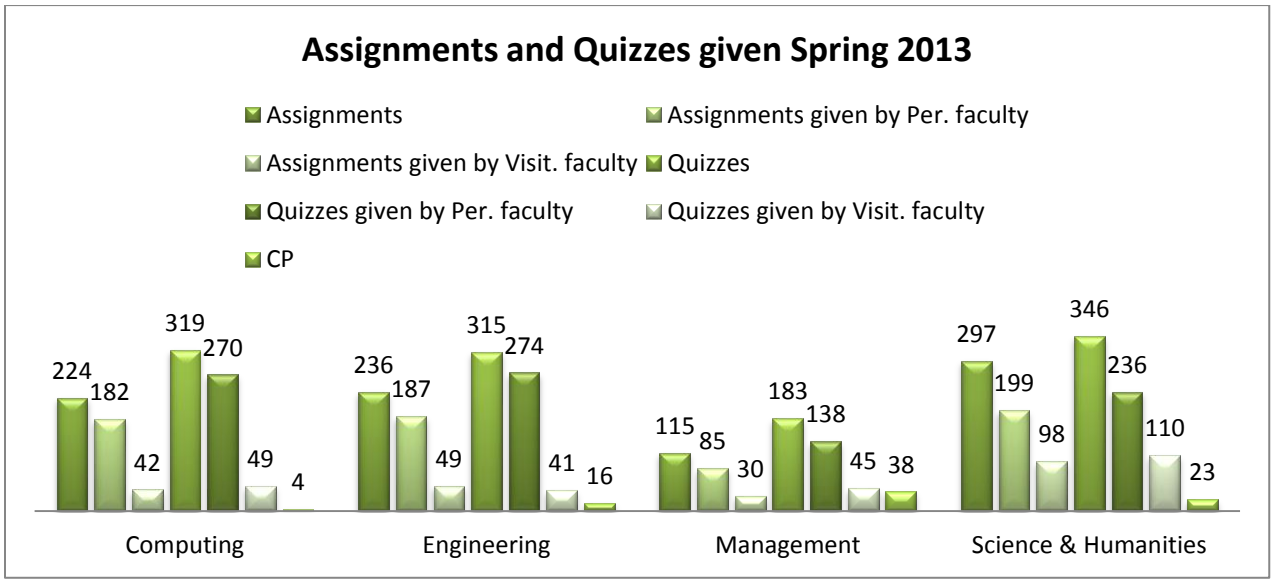


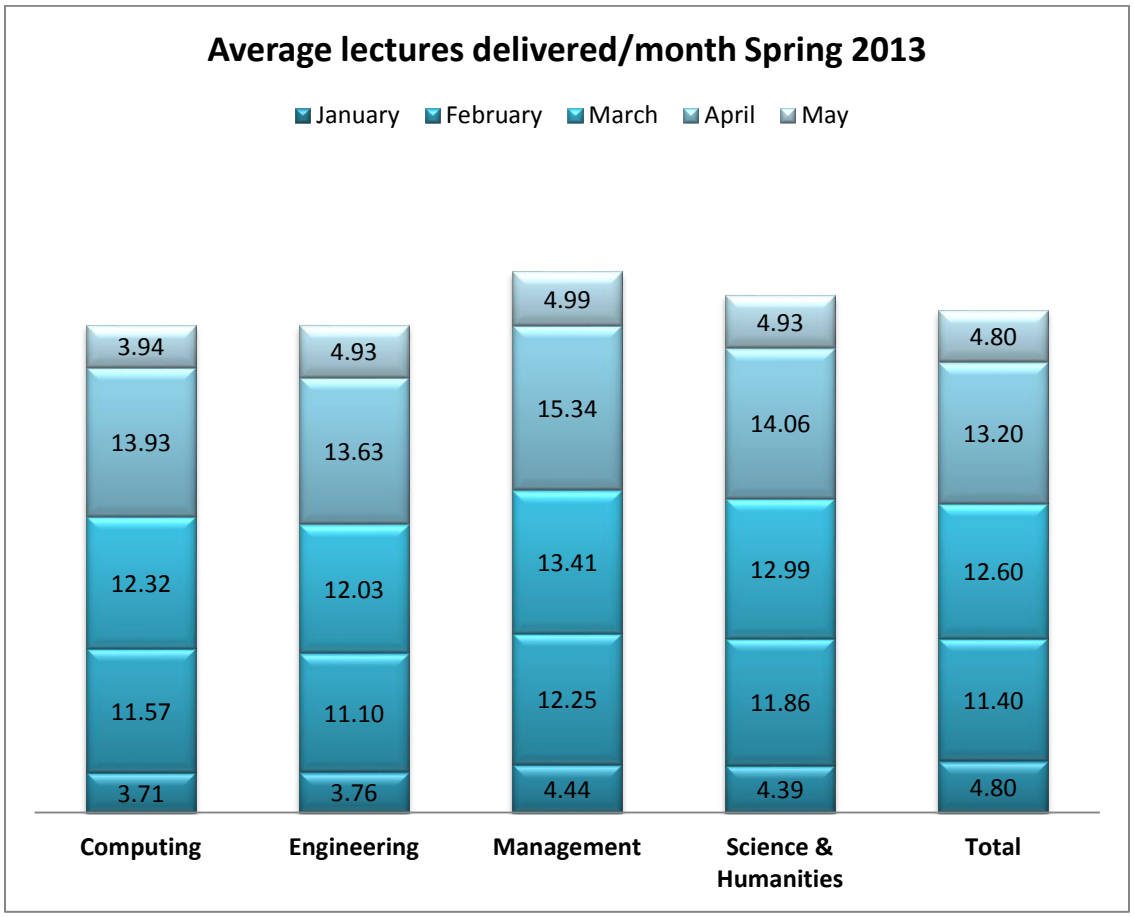


S

Semester Assessment Report






Average lectures delivered/month Spring 2013
January
February
March
April
May
3.94
13.93
12.32
11.57
3.71
4.93
13.63
12.03
11.10
3.76
4.99
15.34
13.41
12.25
4.44
4.93
14.06
12.99
11.86
4.39
4.80
13.20
12.60
11.40
4.80
Computing
Engineering
Management
Science & Humanities
Total

Master Student Course Feedback Report

	Questions	Averages
Course Content and organization	The course objective was clear	4.38
	The course workload was manageable	4.58
	The course was well organized (e.g. timely access to materials, notification of changes, etc.)	4.13
Student Contribution	Did you actively participated in this course	1.58
	Did you learn from this course	4.46
Learning environment and teaching methods	Was this course well structured to achieve the learning outcomes (there was a good balance of lectures, tutorials, practicals etc.)	4.63
	Did the learning and teaching methods encouraged participation?	4.58
	Was classroom environment conducive to learning?	4.58
	Were classrooms satisfactory?	1.42
Learning Resources	Recommended reading books etc. were relevant and appropriate	2.92
	Provision of learning resources in the library was adequate and appropriate (if relevant)	4.04
Quality of Delivery	The course stimulated my interest and thought in the subject area	4.21
	Pace of the course was appropriate	4.17
	Ideas and concepts were presented clearly	4.50
Instructor/TA evaluation	I understood the lectures	4.17
	The instructor was responsive to student needs and problems	4.67
	Had the instructor been regular throughout the course?	4.54
Tutorial	The material in the tutorials was useful	4.63
	I was happy with the amount of work needed for tutorials	4.58
	The tutor dealt effectively with my problems	4.67

Annexure 16

Annexure 17

Details of Engineering Laboratories

1 - Analog Electronics Lab-I

Student/Workbench 2

S.No	Equipment	Qty.
1	Oscilloscopes 40MHz (Kenwood CS-4135A)	22
2	Signal Genrators 10MHz(Topward 8150)	22
3	Power Supplies Variable + Fix (Mps-3003l-3)	22
4	Multimeters (Escort 172)	29
5	Breadboard (KANDH RH-74)	50
6	LCR Meters (Escort-132A)	2
7	Capacitance Meters (TES 1500)	5
8	Wire Strippers (Proskit PK-3162)	27
9	Soldering Iron (Goot 30W)	13

2 - Analog Electronics Lab-II

Student/Workbench 2

S.No	Equipment	Qty.
1	Oscilloscopes 40MHz (Kenwood Cs-4135a)	15
	Oscilloscopes 50MHz (Instek GOS-6050)	7
2	Signal Genrators (Dagatron 8210)	27
3	Power Supplies Variable + Fix (Mps-3003l-3)	27
4	Multimeters (Escort 172)	29
5	Breadboards (Kandh Rh-74)	50

6	LCR Meters (Escort-132a)	2
7	Capacitance Meters (TES 1500)	5
8	Wire Strippers (Proskit PK-3162)	27
9	Soldering Iron (Goot 30w)	12

3 - Microprocessor/Digital Lab

Student/Workbench 2

S.No	Equipment	Qty.
1	Digital Oscilloscope 60MHz (Tektronics, TDS-1002)	27
2	Digital Logic Trainer (RIMS, DEV-2765)	30
3	Microcontroller Kits	40
4	Logic Probs (GW-Instek GLP-1A)	30
5	Power Supplies Variable	07
6	Multimeters (Escort 172)	29
7	Breadboards (KANDH RH-74)	30
8	FPGA Boards (Spartan 3)	5
9	FPGA Boards (Spartan 2E)	5
10	Atmel AVR Kit (STK200 Board USB)	9
11	Ultimate PIC Microcontroller Board	1
12	Universal Programmer (Super Pro 500P)	4
13	Universal Programmer (Super Pro 200P)	1
14	Universal Programmer (Super Pro 2000)	1
15	Universal Prog. (Super Pro L+)	1
16	Universal Prog. (MapWin)	5

17	UV Eprom Eraser	1
18	Wire Strippers (Proskit PK-3162)	27
19	**Computers**	**12**

4 - Communication Lab

	Student/Workbench	**5**
S.No	**Equipment**	**Qty.**
1	Comm. Trainers (Etek DA-2000-01 TO 09 + FG-2002)	10
2	Fiber Optics Trainer (Feedback, EFO 1101)	1
3	Digital Oscilloscope 100MHz (Tektronix, TDS-2012)	10
4	Multimeters (Escort EDM-169)	13
5	**Computers**	**20**

5 - DSP Lab

	Student/Workbench	**3**
S.No	**Equipment**	**Qty.**
1	DSP Trainers (K&H CIC-500)	10
2	DSP Starter Kit (TMS320C6713)	15

6 - Antenna & Microwave Lab

	Student/Workbench	**5**
S.No	**Equipment**	**Qty.**
1	Antenna Lab (Feedback, 57-200-USB)	2
2	Antenna Trainer (Scientech, ST2261A)	3
3	Microwave Trainer (Feedback, 56-200)	2

4	Microstrip Trainer (Feedback, MST 532-1)	2
5	Transmission Line Trainer (Scientech, ST2266)	5
6	Oscilloscopes 50MHz (Instek GOS-6050)	5
7	Multimeters (Escort 169)	5
9	Microwave Design Software (Feedback)	1
10	**Computers**	**08**

7 - Control Lab

S.No	Equipment	Qty.
1	ELVIS-II Main Board	8
2	Inverted Pendulum for ELVIS-II	8
3	DC Motor Control for ELVIS-II	8
4	PLC Trainer with five Different Modules	5
5	Linear 2-Stage Pendulum	1
6	Analog Control Training System	1
7	Magnetic Lavitation System	1
8	PLC Conveyer Belt Trainer	1
9	**Computers**	**10**

8- FYP Lab

S.No	Equipment	Qty.
1	Oscilloscope GW-INSTEK GOS 6050	5

2	Function Generator DAGATRON Model-8210	5
3	Function Generator TOPWARD Model-8150	8
4	Power Supply Analog	20
5	Power Supply Digital MPS3003L-3	10
6	Bread Board	50
7	DMM Sanwa CD800A	30
8	Wire Stripper	30

9- Instrumentation & Measurement Lab

S.No	Equipment	Qty.
1	M serier DAQ	5
2	SCC-68, I/O Cnnector Block with 4 SCC signal Conditioning Modules Slot	5
3	SCC-D001, Isolated digital output module	5
4	SSC-TC01, Thermocouple Input Module Mini plug	5
5	SHC68-68-EPM Shielded cable, 68 position. 050 serier D-Type, 2M.	5
6	EKG Sensor	5
7	Gas Pressure Sensor	5
8	Motion Detector	5
9	Photogate	5
10	Low-g Accelorometer	5
11	J-Type Thermocouple wire 2-Meter	5
12	Analog Proto Board Connector	5
13	Analog Proto Board Connector	5

10 - Networking Lab

Student/Workbench **5**

S.No	Equipment	Qty.
1	Access Point, Wireless 108G (D-Link)	6
2	Switch & Portt, DES-1008D (D-Link)	6
3	Desktop Adapter Wireless G (D-Link)	6
4	Network Cable Tester (Bayland)	1
5	Crimping Tool (Proskit CP-376TR)	5
6	Wire Stripper	3
7	**Computers**	**25**

11 - Physics Lab

Student/Workbench **3**

S.No	Equipment	Qty.
Mechanics		1
1	Hooke's Law, Scienceworkshop	1
2	Scienceworkshop 500 Interface	1
3	Usb/Serial Converter	1
4	Newton's Laws	1
5	Sliding Friction	1
6	Centripetal (Circular) Force Experiment	1
7	Conservation Of Momentum Experiment	1
8	750 Interface, Usb	1

9	Datastudio, Site License	1
10	Projectile Motion	1
11	Rotational Inertia Experiment	1
12	Torsional Pendulum Experiment	1
13	Variable-G Pendulum Experiment	1

Thermodynamics

1	Thermal Expansion Experiment	1
2	Scienceworkshop 500 Interface	1
3	Usb/Serial Converter	1
4	Ideal Gas Law, Scienceworkshop	1
5	Ratio Of Specific Heats Experiment	1
6	Heat Engine Cycles Experiment	1

Optics/Light

1	Polarization Of Light Experiment	2
2	Diffraction Of Light	2
3	Scienceworkshop 500 Interface	1
4	Usb/Serial Converter	1
5	Speed Of Light Experiment	1

Sound

1	Resonance Tube	1
2	750 Usb Complete	1
3	Voltage Sensor	1
4	Power Amplifier Ii (Mac & Win)	1
5	Doppler Rocket	1

Electricity & Magnetism

1	Ohm's Law, Scienceworkshop	1
2	Scienceworkshop 500 Interface	1
3	Usb/Serial Converter	1
4	Faraday's Law Experiment	2
5	Coulomb's Law Experiment	1
6	Charge Of An Electron Experiment	1
7	Magnetic Force On Wires Experiment	2
8	Magnetic Fields In Coils Experiment	2

Computers

1	Computers	5

12 - Test & Measuring Equipment Lab

S.No	Equipment	Qty.
1	Oscilloscope, DSO6052A- 2channel, 500MHz	1
2	Oscilloscope, MSO6102A- 2+16 channel, 1GHz	1
3	1156A - 1.5GHz Active Probe	1
4	N9310A - RF Signal Generator 9KHz to 3.0GHz	1
	N9310A-001 - Add Analog IQ Input Capability	1
	N1996A - Agilent CSA Spectrum Analyzer	1
5	N1996A - 503 Frequency Range, 100KHz - 3GHz	1
	N1996A - AFM - Audio tune and Listen for AM / FM	1
6	82357B - USB/GPIB Interface	2
7	10833A - GPIB cable, 1 meter	3

8	85022A - System cable kit, GPIB & BNC for 8756 & 8757	1
9	1250-0780 - Adapter-Coax F-BNC M-N	2
10	812-1840 - Cable-ASSY-Coax RG/223-CBL 48 IN LG	2

13-Embedded System Lab

S.No	Equipment	Qty
1	MEMSIC TPR2420CA TelosB Mote (with Sensors)	10
2	MEMSIC TPR2400CA TelosB Mote (without Sensors)	4
3	mbed - LPC1768 Development Board	10
4	Different Sensors	50

14 – Machine Lab

S.No	Equipment	Qty
1	Transformer Trainers	6
2	DC Machine Trainers	2
3	AC Machine Trainers	6

15 – Engineering Workshop

a. PCB Design

S.No	Equipment	Qty.
1	PCB Design CNC Machine	1
2	CCD/2 Manual Change CNC Machine	1
3	ISOCAM SOFTWARE for ISOLATION ROUTING	1
4	30º Isolation Milling Routers for Fine Routing	5

5	60º Isolation Milling Routers	5
6	SET OF 50 ASSORTED DRILLS	1
7	Drill Collars Fitted to Drills and Routers	65
8	MELAMINE 0.8mm DRILL ENTRY BOARD 12"x 18"	10
9	1.5MM DRILL EXIT BOARD (ALUM.) 12" X 18"	10
10	5 ASSORTED POINT END CUT ROUTERS 3.175mm SHANK	1

b- Fitter Shop

S.No	Equipment	Qty.
1	Working Table	3
2	Smooth File	16
3	Round File	12
4	Triangular File	2
5	Square File	2
6	Hammer	1
7	Protector	4
8	Divider	4
9	Screw Driver Set	1
10	Scriber	6
11	Pipe Wrench	1
12	Adjustable	1
13	Center Punch	4
14	Venire Caliper	3
16	Square 10"	12
17	Goggles	12

18	Plier	1
19	Nose Plier	1
20	Grinder	1
21	Table Drill Machine	1
22	Gloves	12
23	Hex	13
24	Cut-Off Machine 355mm, Disc size 14'''	1
25	Socket Set	1
26	Spanner Set 12pcs	1

c- Wood Shop

S.No	Equipment	Qty.
1	Working Table	3
2	Tri square	11
3	Hammer	11
4	Files	6
5	Wood Planer	2
6	Goggles	12
7	Wood Saw	12
8	Screw Driver Set	1
9	Chisel	12
10	Planner	3
11	Table Wood Cutter	1
12	Planner 710W	1

d – Electric Shop

S.No	Equipment	Qty.
1	Wiring Boards	10
2	Phase Tester	10
3	Plier & Wire Cutter	10

Annexure 18

Library Details

1. BUDGET

Total Budget	1.75 million

2. BOOKS

Library has more than 12,055 books.
Major subjects are as follows:
Electrical/Electronics & Computer Engineering:
Computer Science:
Management Sciences:
Allied Subjects:

3. CDs COLLECTION

Lecture CDs	570
Accompanying Material	848

4. PROJECT REPORTS

Project Reports	645

5. ELECTRONIC EQUIPMENTS

PC	24
Printer	01
Barcode Reader	01
CCTV System	01 (14 Cameras)
Scanner	02
Photocopier	01
Paper Shredder	01
DVD/CD Burner Tower	01 (Write Up to 04 DVD/CD)

Electronic Subscriptions:-

- HEC Digital Library (All Countrywide Resources)
- Ebrary…….. It offers an increasing selection of more than 55,000 e-Books in business, economics, computers, engineering and technology. The e-books support program allows researchers to access most of the important text and reference books electronically in a variety of subject areas.
- IMF ELibrary ……..The International Monetary Fund's (IMF) eLibrary simplifies analysis and research with direct access to the IMF's periodicals, books, working papers and studies, and data and statistical tools.

Subscribed Journals/Magazines

Journals Having IF	16
Int. Journals/Magazines (Non IF)	12
Other Magazines	09
Total	**37**

Total Impact Factor 34 *(As per JCR 2011)*

Journals Having Impact Factor

Sr. No	Title	Frequency	Impact Factor
1	IEEE Internet Computing Magazine	Bimonthly	2
2	IEEE Trans.on Software Engineering	Monthly	1.98
3	IEEE Pervasive Computing	Quarterly	1.554
4	IEEE Trans. on Knowledge and Data Engineering	Monthly	1.657
5	IEEE Trans. On Evolutionary Computation	Bimonthly	3.341
6	IEEE Security & Privacy Magazine	Bimonthly	0.898
7	IEEE Antennas and Propagation Magazine	Bimonthly	0.968
8	IEEE Control Systems Magazine	Bimonthly	2.491
9	IEEE Microwave Magazine	Bimonthly	2.111

10	IEEE Trans. On Microwave Theory & Techniques	Monthly	1.853
11	IEEE Signal Processing Magazine	Bimonthly	4.066
12	IEEE/ACM Trans. On Networking	Bimonthly	2.033
13	IEEE Spectrum	Monthly	1.139
14	Scientific American	Monthly	2.369
15	Harvard Business Review	Monthly	1.269
16	MIS Quarterly	Quarterly	4.447

International Journals/Magazines (Non Impact Factor)

Sr. #	Name of Magazine
1.	IEEE Computer Magazine
2.	ACM Communication Magazine
3.	MacWorld
4.	Maximum PC
5.	Popular Science
6.	Asian Journal of Management Cases
7.	HR Magazine
8.	The Economist
9.	Reader Digest
10.	Newsweek
11.	National Geographic
12.	Time

Local Journals/ Magazines

Sr. #	Name of Magazine
1.	Pakistan Economic and Social Review (PU)
2.	The Pakistan Development Review
3.	Pakistan Journal of Commerce and Social Sciences
4.	Herald
5.	Spider
6.	Synergyzer
7.	Aurora
8.	Shifa News
9.	Al-Aqerba