Self Assessment Report

Beaconhouse National University

School of Computer & Information Technology

(B.Sc. (Hons) in Computer Science)

Prepared by: Program Team (PT) of SCIT
Prepared by: Quality Assurance Department

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EXECUTIVE SUMMARY

This report is being prepared at the end of the assessment of School of Computer and Information Technology (SCIT) of Beaconhouse National University (BNU), as per requirement of Higher Education Commission (HEC). Quality Assurance Department (QA) was formed at BNU in September 2005. Program Team Members notified by University worked with General Manager Quality Assurance to pursue the application of Self-Assessment Manual in their respective department.

In School of Computer and Information Technology (SCIT), B.Sc. in Computer Science program was selected for the self-assessment, evaluation and improvements. Commitment of respected Vice Chancellor to support Quality Assurance Department made the difference and resultantly, a cycle of assessment is about to complete.

Objectives

Following are the two main objectives of the self-assessment report:

1. To implement Self-Assessment Manual in selected program with a view to improve quality in higher education.

2. To identify areas requiring improvements in order to achieve objectives through desired outcomes.

Execution

A soft and hard copy of self assessment manual was given to Dean and faculty. Quality Awareness presentation of Self-Assessment Report (SAR) was arranged for the Dean and Program Team Members (PT) of the selected program. Hard copies of ten proformas issued by HEC along with manual including 8 criteria and 31 standards were provided to PT members to evaluate their program against defined standards. The PT members with support and follow up of QA, completed the SAR and forwarded to QA.

After reviewing SAR, QA arranged visit of Assessment Team to the selected program on May 08, 2019. GM (QA) accompanied the AT and participated in discussions with Dean and PT members and available faculty members. Date for exit meeting was fixed as May 16, 2019.

The Chairman AT indicated salient points of the SAR, improvements required in the infrastructure, syllabi and training of the faculty and support staff. A few
points were resolved during discussion.

The implementation plan discussed in exit meeting have been made by In-charge Programs. They prepared it under following headings:

a. Assessment Team findings
b. Corrective actions required
c. Resources required

The implementation plan indicates the resources to improve the infrastructure in the classes and labs. The recommended target dates to complete the tasks observed by Assessment Team, presented in exit meeting on May 16, 2019 and approved by Vice Chancellor have been indicated in the implementation plan.

At the completion of Self-Assessment cycle, QA submitted the hard and soft copy of SAR to HEC on August 10, 2019.

General Manger (QA)

INTRODUCTION

The School of Computer and IT, following in the tradition of Beaconhouse School System, lays great emphasis on quality of instruction, ethical values and professional practice.

With Information Technology becoming the backbone of Pakistan's services sector, the professional degrees offered by the School of IT are extremely relevant to the needs of the market. The School is equipped with adequate lab, internet and library facilities. Co-curricular activities are encouraged under the aegis of different student societies. BNU has an exchange program with five Turkish Universities through which students can spend one semester of their studies in Turkey.

The School currently offers the following programs of study, which are approved/accredited by the HEC:

- BSc (Hons) in Computer Science (CS) 4-year program
- BSc (Hons) in Software Engineering (SE) 4-year program

The teaching – learning model followed by School of Computer& Information Technology greatly emphasizes practical work to enforce understanding of theoretical concepts.

CRITERION-1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

INSTITUTION MISSION STATEMENT

"Fostering empowered and impactful global citizens in a merit-based, sensitive, inclusive, interdisciplinary, liberal arts environment"

Standard 1-1 The program must have documented measurable objectives that support institution mission statements.

Department Vision Statement (School of Computer & IT)

To be among the leading Schools in Pakistan in the field of IT Education and Research.

Department Mission Statement (School of Computer & IT)

To provide quality education in IT in a professional and friendly environment.

This mission will be achieved by offering market relevant academic programs in IT in a progressive and friendly learning environment. We will retain highly qualified and dedicated faculty, provide up-to-date resources and pursue policies which are based on performance and merit.

Program Mission Statement (B.Sc (Hons) in Computer Science)

The mission of B.Sc. (Hons) in Computer Science program is to prepare graduates to solve computational problems by providing them a strong foundation in computing theories and their applications. We aim to equip graduates with the knowledge and experience of cutting edge technologies. Our intention is to produce professionals who have the required problem solving skills and the capability to advance their careers in a rapidly evolving field by fostering a mindset for lifelong learning.

Program Educational Objectives

The B.Sc. (Hons) in Computer Science is designed to achieve following objectives:

1. To provide students with strong foundations in mathematics and theories of computer science with an ability to analyze computing requirements.
2. To prepare students to apply current tools and techniques to design computerized systems keeping in view the tradeoffs in design options.
3. To prepare students for higher studies in multidisciplinary computer science areas like database design, networks design and maintenance, artificial intelligence, data science, and others.
4. To inculcate professional and ethical values in the students so they can work as IT professionals and entrepreneurs.
5. To impart effective communication and leadership skills in the students

The School of IT has built up its academic environment keeping in view the above program objectives. The selection of faculty, design of curriculum, instructional procedures and practice-based methodologies help enforce the above program objectives.

The School of IT is supported in its efforts by the Quality Assurance Department of Beaconhouse National University.

Strategic Plan

School of Computer & IT is focused to fully implement the prescribed HEC curriculum in which various quality parameters are verifiable and bench marked.

To this end, the School of IT follows the HEC academic guidelines and has updated its curriculum in line with the recommendations of NCEAC, the accreditation authority set up by the HEC. Students are encouraged to complete at least one Summer Internship during their degree to get practical experience in the industry.

The main focus of School of Computer and IT is to build on its strengths and work on its weaknesses to improve the overall quality of the degree program.

Program Objective's Assessment

The following table shows how each of the above program objectives is measured and the actions taken as a result of these measurements.

The three tools for assessments of program objectives are:

1. Employer Survey
2. Alumni Survey
3. Graduating Students Survey

Objectives	How Measured	When Measured	Improvement Identified	Improvement made
1	Current Students Survey (course evaluation)	At the conclusion of each course.	Requirement analysis is not very strong after 1 year of studies	Need for end of course mini projects where students can be trained to conduct requirement analysis in different scenarios
2	Current Students Survey (course evaluation)	At the conclusion of each course.	Need to design courses with current technologies As quite a few graduates completed or are currently pursuing higher degrees	Relevant Electives to be added in the 3rd and 4th year of the degree
3	Review of the curriculum as per HEC guidelines	Every year	NIL	NIL
4	Review of the curriculum as per HEC guidelines	Every year	Nil	Nil
5	Current Students Survey (course evaluation)	At the conclusion of each course	Better interpersonal skills required to be inculcated	Multiple presentations to be made part of each

				course

Table 1.1: Program Objectives Assessment

Standard 1-2: The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the program objectives and that graduating students are capable of performing these outcomes.

Program Outcomes

B.Sc. (Hons) in Computer Science has the following program outcomes. By the end of the program the students should be able to:

1. Determine the computing requirements after thorough problem analysis.
2. Apply mathematical concepts, and computing algorithms to design computerized systems as per identified needs.
3. Have proficiency in at least two programming languages at the end of their degrees.
4. Analyze impact of international computing tools on organizations, individuals and society so that correct solutions to their requirements may be designed.
5. Communicate in written, verbal and graphical forms through the use of professional visual tools.
6. Work effectively in multidisciplinary teams to solve problems related to computing field.
7. Able to retrieve relevant information from computer science literature.

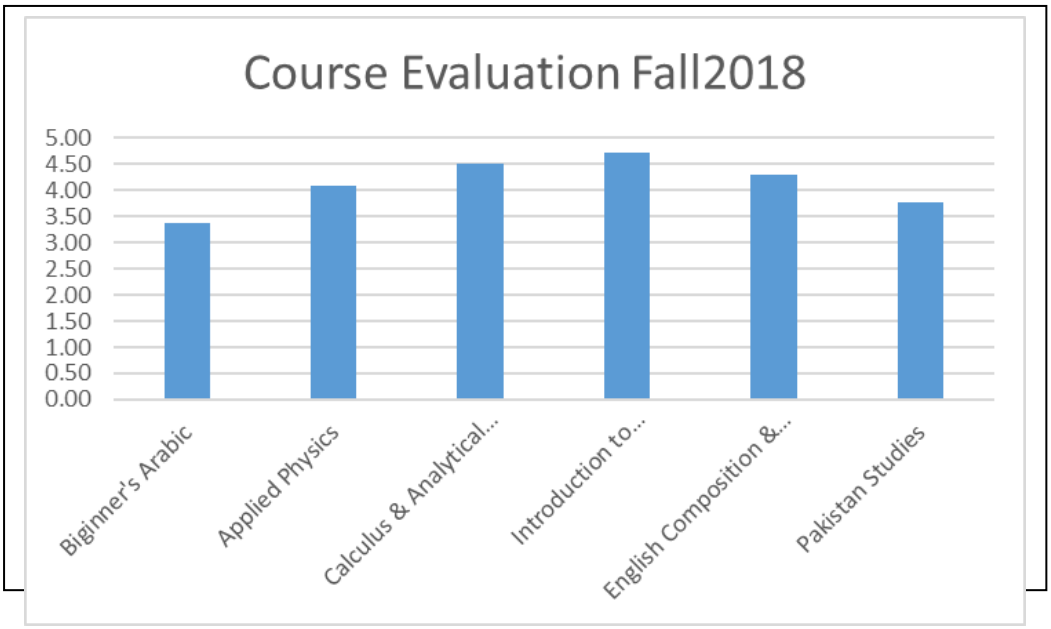
Program Objectives	**Program Outcomes**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	
1	**X**	**X**		**X**				
2	**X**	**X**	**X**					
3		**X**	**X**	**X**		**X**		
4					**X**	**X**	**X**	**X**
5					**X**	**X**	**X**	**X**

Table 1.2: Outcomes versus objectives

Standard 1-3: The results of the program's assessment and the extent to which they are used to improve the program must be documented.

The program assessment is done through a faculty evaluation form by QA department. The students of the program evaluate faculty in each course offered in the Computer Science program.

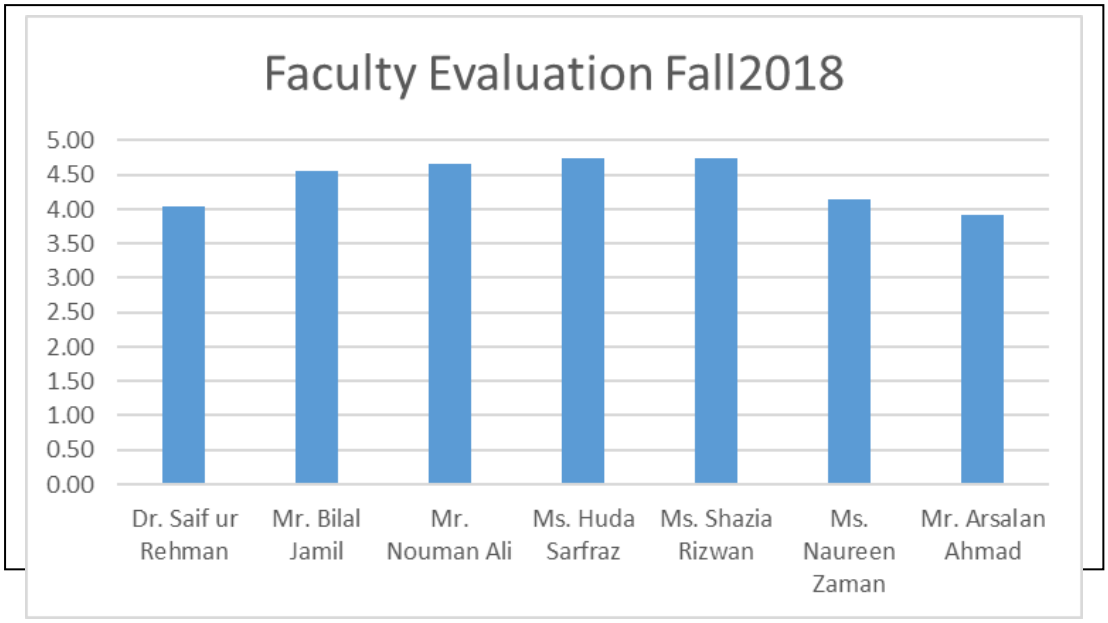
Course-wise (Fall-2018)



Sr. No	Course Title	Course Evaluation (out of 5)
1.	Beginner's Arabic	3.37
2.	Applied Physics	4.09
3.	Calculus & Analytical Geometry	4.52
4.	Introduction to Information & Comm Technologies	4.73
5.	English Composition & Comprehension	4.29
6.	Pakistan Studies	3.76

Table 1.3: Course Table

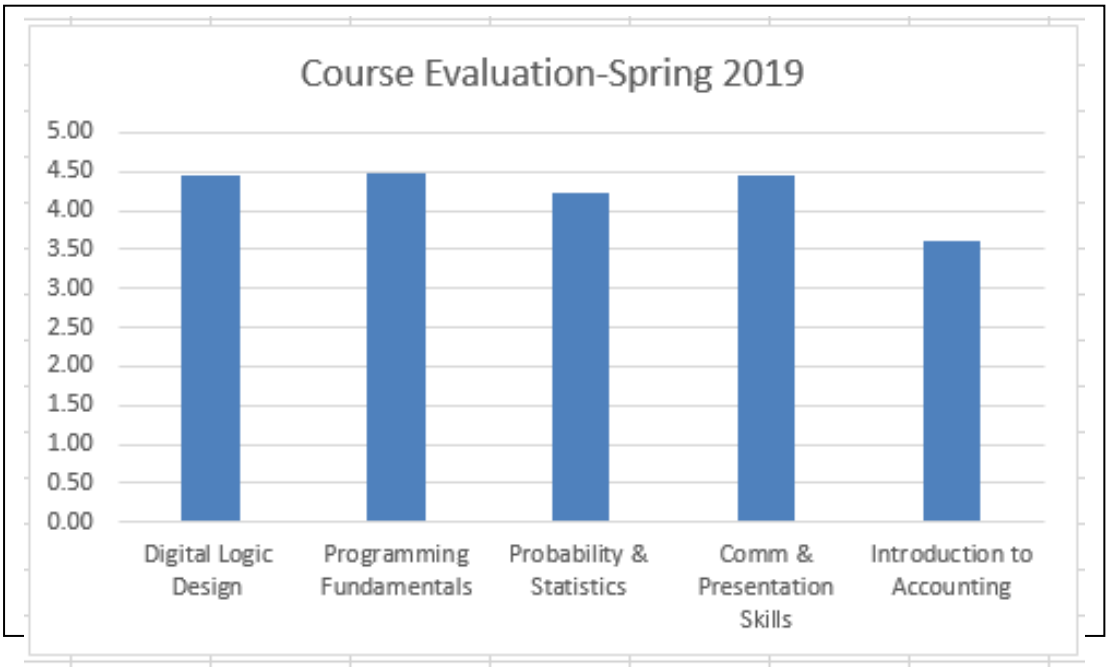
Course Instructor Evaluation (Fall-2018)



Sr. No	Name of Faculty	Evaluation (out of 5)
1.	Dr. Saif ur Rehman	4.05
2.	Mr. Bilal Jamil	4.56
3.	Mr. Nouman Ali	4.66
4.	Ms. Huda Sarfraz	4.74
5.	Ms. Shazia Rizwan	4.75
6.	Ms. Naureen Zaman	4.14
7.	Mr. Arsalan Ahmad	3.92

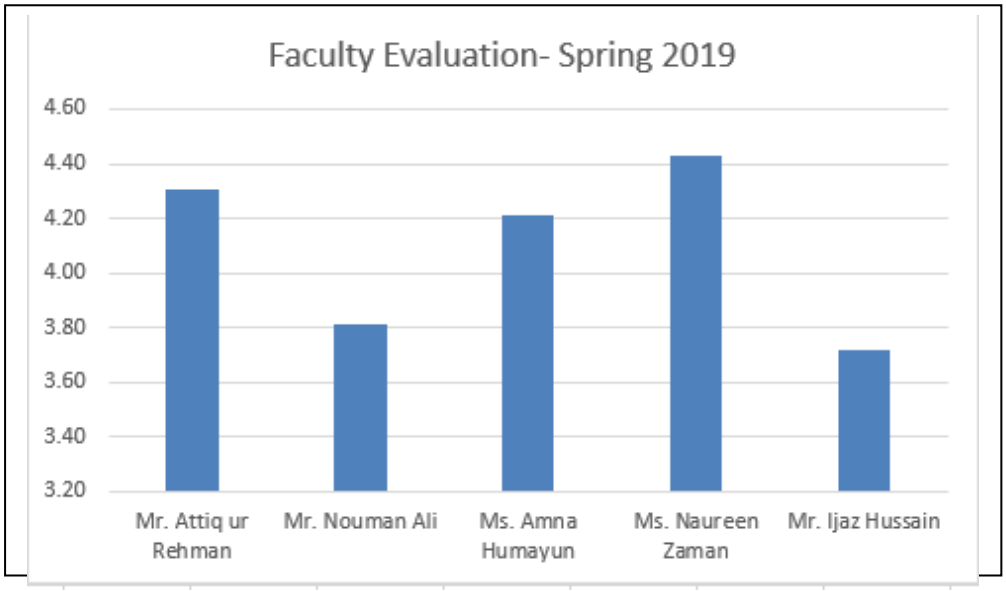
Table 1.4: Faculty List Fall 2018

Course-wise (Spring-2019)



Sr. No	Course Title	Course Evaluation (out of 5)
1.	Digital Logic Design	4.45
2.	Programming Fundamentals	4.49
3.	Probability & Statistics	4.22
4.	Comm & Presentation Skills	4.45
5.	Introduction to Accounting	3.62

Table 1.5: Course Table



Sr. No	Name of Faculty	Evaluation (out of 5)
1.	Mr. Attiq ur Rehman	4.31
2.	Mr. Nouman Ali	3.81
3.	Ms. Amna Humayun	4.21
4.	Ms. Naureen Zaman	4.43
5.	Mr. Ijaz Hussain	3.72

Table 1.6: Faculty List Fall 2018

Our Strengths

i. School of Computer & IT (SCIT) focuses on developing students for the industry. For this market oriented technologies are taught and courses are introduced accordingly

ii. High faculty student ratio and friendly environment encourages quality interaction between faculty and students.

iii. SCIT is focused to produce graduates who are ready for the Industry with correct amount of practical exposure to the latest computing tools.

iv. SCIT has experienced faculty with mix of foreign and local degree holders with average teaching and industry experience of more than 12 years.

v. SCIT engages at least 1 external supervisor for each project so students are supervised by industry experts and get exposure of latest technologies that are used in market

Our Weaknesses

i. SCIT finds it difficult to engage industry professionals for guidance of final year project students, however, school tries its level best to engage at least 1 external supervisor for each project and is managing it since its inception.

ii. Insufficient liaison with the current industry for placing graduates as they complete their degree requirements.

iii. The department does not offer core courses every semester, only few repeat courses are offered in summer which is dependent on university's minimum enrollment requirement. This causes delays in the graduation of the students.

iv. Computer systems are not upgraded in the department's general labs.

Our Future Plans

i. Minimum one new lab is in pipeline to be added by the end of this year.

ii. Faculty size will be increased to offer more electives in the degree program.

iii. SCIT is also considering to launch an in house incubation center where final year project students will be able to work in a designated lab. For this external resources will be engaged to mentor and guide students. This will help them build their products and get ready for the market

iv. SCIT plans to launch graduate program in software engineering

v. SCIT plans to build strong relationship with different software companies so students can be offered internship opportunities during. This will not only bridge industry academia gap but will also increase the acceptability of the graduates in market. Better relationship with the industry is one of the top priorities to get the internship/employment opportunities.

Standard 1-4: The department must assess its overall performance periodically using quantifiable measures.

As the program has been recently started so it has no prior data available.

Status Report of Students (SCIT)

Semester	FY	Applicants	Admitted	Left	Struck Off	Studying
F2018	2018-19	67	26	1	8	17
S2019		0	0	0	0	0
Grand Total		**113**	**51**	**20**	**7**	**24**

CRITERION 2: CURRICULUM DESIGN AND ORGANIZATION

Standard 2-1: The curriculum must be consistent and supports the program's documented objectives.

Title of Degree Program

B.Sc. (Hons) in Computer Science

Definition of credit hour:

One credit hour is 1 hour of theory lecture or 2 hours of laboratory work in a week.

Degree plan

Following is the list of all courses offered by the School of IT in B.Sc. (Hons) in Computer Science degree.

Course Code	Course Type	Course Title	Cr.Hrs.	Pre-Req.
Semester I (Total Credits 17.5)				
CSC-112	GE	Intro to Info. & Comm. Technologies	2-1	-
ELU-103	GE	English Composition & Comprehension	3	-
CSC-111	SE-E	Creating Web Content (SE- Elective -I)	3-1	-
MTH-106	MSF	Calculus & Analytical Geometry	3	-
MTH-105	MSF	Applied Physics	3	-
SLA-102	GE	Pakistan Studies	1.5	-
Semester II (Total Credits 17)				
MTH-201	MSF	Probability & Statistics	3	-
CSC-115	CC	Programming Fundamentals	3-1	CSC-112
ELU-104	GE	Communication & Presentation Skills	3	ELU-103
CSC-104	CS-C	Digital Logic Design	3-1	MTH-105

	UE	University Elective-I(Eco./Accounting)	3	
Semester III (Total Credits 17)				
CSC-213	CC	Object Oriented Programming	3-1	CSC-115
MTH-204	CS-S	Differential Equations (CS-Supp-I)	3	-
CSC-202	CC	Database Systems	4	CSC-115
MTH-203	MSF	Linear Algebra	3	-
	UE	University Elective-II (Arabic /Punjabi)	3	-

Semester IV (17.0)				
ELU-301	GE	Technical & Business Writing	3	ELU-104
CSC-214	CC	Data Structures & Algo.	4	CSC-213
CSC-205	CS-C	Comp Organization & Assembly Lang.	3-1	-
CSC-105	CC	Discrete Structures	3	-
CSC-402	CS-C	Theory of Automata	2-1	-
Semester V (16.0)				
CSC-312	CS-C	Compiler Construction	3	CSC-402
CSC-217	CC	Operating Systems	3-1	CSC-213
CSC-316	CS-C	Design & Analysis of Algo.	3	CSC-214
CSC-215	CS-E	CS-Elective - II (WSD)	3	
CSC-320	CC	Software Engineering For CS	3	-
Semester VI (17.0)				
	CS-S	CS-Supporting - II	3	-
CSC-209	CC	Computer Networks	3-1	-
HUM-303	GE	Professional Practices	3	-
CSC-324	CS-E	CS- Elective - III (Web Eng., Mobile App, Game Dev, HCI)	3	
CSC-321	CS-C	Artificial Intelligence	3-1	-
Semester VII (15.0)				
CSC-407	CS-C	Parallel & Distributed Computing	3	CSC-217
	UE	Univ Elective III (POM,POMkt,RPI)	3	-
CSC-305	CC	Information Security	3	-
	CS-E	CS- Elective - IV	3	-
PRJ-403	CC	Project Part I	3	90 CrHrs
Semester VIII (13.5)				
	CS-S	CS-Supporting - III	3	-
	CS-E	CS- Elective - V	3	-
PRJ-404	CC	Project Part II	3	PRJ-403
	UE	Univ Elective IV (Psychology,Photography)	3	-
SLA-103	GE	Islamic Studies	1.5	-

Abr.	Course Type
CC	Computing Core Courses
GE	General Education Courses
UE	University Elective
MSF	Maths & Science Foundation Course
CS-C	CS Core Courses
CS-S	CS Supporting Courses
CS-E	CS Elective Courses

Table 1.9 Abbreviations Used

Comparison of B.Sc. (Hons) in Computer Sciences Curriculum with HEC Curriculum

Abr.	Course Type	Total Courses	Total Credits
CC	Computing Core Courses	11	39
GE	General Education Courses	7	18
UE	University Elective	4	12
MSF	Maths & Science Foundation Course	4	12
CS-C	CS Core Courses	7	24
CS-S	CS Supporting Courses	3	9
CS-E	CS Elective Courses	5	16
	TOTALS	41	130

Table 1.10: BS-CS Cr Hrs Totals at SCIT

HEC Revised Curriculum - 2017 - CS					
COURSE CODE	COURSE TITLE	CREDIT HOURS	Semester	Semester	Course Type
	Intro to Info. & Comm. Technologies	3	I		GE
	English Composition &	3	I		GE
	Programming Fundamentals	4	I		CC
	Calculus & Analytical Geometry	3	I		MSF
	Applied Physics	3	I		MSF
				16.0	
	Digital Logic Design	4	II		CS-C
	Object Oriented Programming	4	II		CC
	Communication & Presentation	3	II		GE
	Probability & Statistics	3	II		MSF
	University Elective - I	3	II		UE
				17.0	
	Comp Organization & Assembly	4	III		CS-C
	Data Structures & Algorithms	4	III		CC
	Discrete Structures	3	III		CC
	Professional Practices	3	III		GE
	CS Supporting -I	3	III		CS-S
				17.0	
	Design & Analysis of Algo.	3	IV		CS-C
	Database Systems	4	IV		CC
	Theory of Automata	3	IV		CS-C
	Linear Algebra	3	IV		MSF
	University Elective -II	3	IV	16.0	UE
	Compiler Construction	3	V		CS-C
	Operating Systems	4	V		CC
	Software Engineering For CS	3	V		CC
	CS-Supporting - II	3	V		CS-S
	CS-Supporting - III	3	V		CS-S
				16.0	

	Artificial Intelligence	4	VI		CS-C
	Computer Networks	4	VI		CC
	Technical and Business Writing	3	VI		GE
	CS- Elective - I	3	VI		CS-E
	CS- Elective - II	3	VI		CS-E
				17.0	
	Parallel & Distributed Computing	3	VII		CS-C
	Pakistan Studies	2	VII		GE
	CS- Elective - III	3	VII		CS-E
	CS- Elective - IV	3	VII		CS-E
	Univ Elective - III	3	VII		UE
	Project Part - I	3	VII	17.0	CC
	CS- Elective - V	3	VIII		CS-E
	Univ Elective -IV	3	VIII		UE
	Final Year Project - II	3	VIII		CC
	Information Security	3	VIII		CC
	Islamic Studies	2	VIII	14.0	GE
	TOTALS	40		130	

Table 1.11: HEC Degree Roadmap

Abr.	Course Type	Total	Cr.Hrs.
CC	Computing Core Courses	11	39
GE	General Education Courses	7	19
UE	University Elective	4	12
MSF	Maths & Science Foundation Course	4	12
CS-C	CS Core Courses	7	24
CS-S	CS Supporting Courses	3	9
CS-E	CS Elective Courses	5	15
	TOTALS	41	130

Table 1.12: HEC Cr Hrs. Totals

Standard 2-2: Theoretical background, problems analysis and solution design must be stressed within the program's core material.

Courses/ Group of courses	Objectives				
	1	2	3	4	5
(A) Computing Core Courses	✓	✓	✓		

(B) General Education Courses C	✓			✓	✓
(C) University Elective Courses				✓	✓
(D) Maths and Sci Foundation Courses	✓	✓			
(E) CS Core Courses	✓	✓	✓		
(F) CS Supporting Course	✓	✓	✓		
(G) CS Electives		✓	✓		

Table 1.13: Standard 2-2 requirement

Indicate which courses contain a significant portion (more than 30%) of the elements in standard 2-2.

Elements	**Course (ref: Table 1.11)**
Theoretical background	Group A , B, C, D
Problem analysis	Group D , E, F, G
Solution design	Group A, E, F, G

Table 1.13: Standard 2-2 requirement

Standard 2-3: The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body.

- ***Please refer to Standard 2- 1***

Standard 2-4: The curriculum must satisfy the major requirements for the program as specified by HEC, the respective accreditation body / councils.

- ***Please refer to Standard 2- 1***

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 / council.

- ***Please refer to Standard 2- 1***

Standard 2-6: Information technology component of the curriculum must be integrated throughout the program

- ***Please refer to Standard 2- 1***

Standard 2-7: Oral and written communication skills of the student must be developed and applied in the program.

- ***Please refer to Standard 2- 1***

CRITERION 3: LABORATORIES AND COMPUTING FACILITIES

The School of Computer and Information Technology contain the following Labs:

1. General Computing Lab-1 (Room 311)

This lab contains thirty workstations and one laser printer. All required software for the B.Sc. (Hons) in Computer Science program are available on each workstation. (Inventory List attached in Annexure-A)

2. General Computing Lab-2 (Room 314)

This lab contains thirty-seven workstations. All required software for the B.Sc. (Hons) in Computer Science program are available on each workstation. (Inventory List attached in Annexure-B)

3. Networks Lab (Room 303)

The lab contains sixteen workstations and other equipment necessary to carry out experiments in Data communication and Networking course. (Inventory List attached in Annexure-C)

4. Project Lab (Room 308)

This lab contains twenty workstations. All required software for the Final Year Projects courses in senior year are available for B.Sc. (Hons) in Computer program.

5. DLD Lab (Room B-2)

The lab contains digital trainers, microprocessor trainers, digital meters and other equipment to conduct labs for Digital Logic Design course. (Inventory List attached in Annexure-D)

Standard 3-1: Laboratory manuals/ documentation/ instructions for experiments must be available and readily accessible to faculty and students.

The above mentioned labs facilitate the students in performing lab exercises and projects relating to the courses offered in Computer Science program. Lab manuals are timely prepared and periodically audited by NCEAC teams

Courses with lab element are indicated either by their 4 credit hours (3+1) or 3 credit hours (2+1).

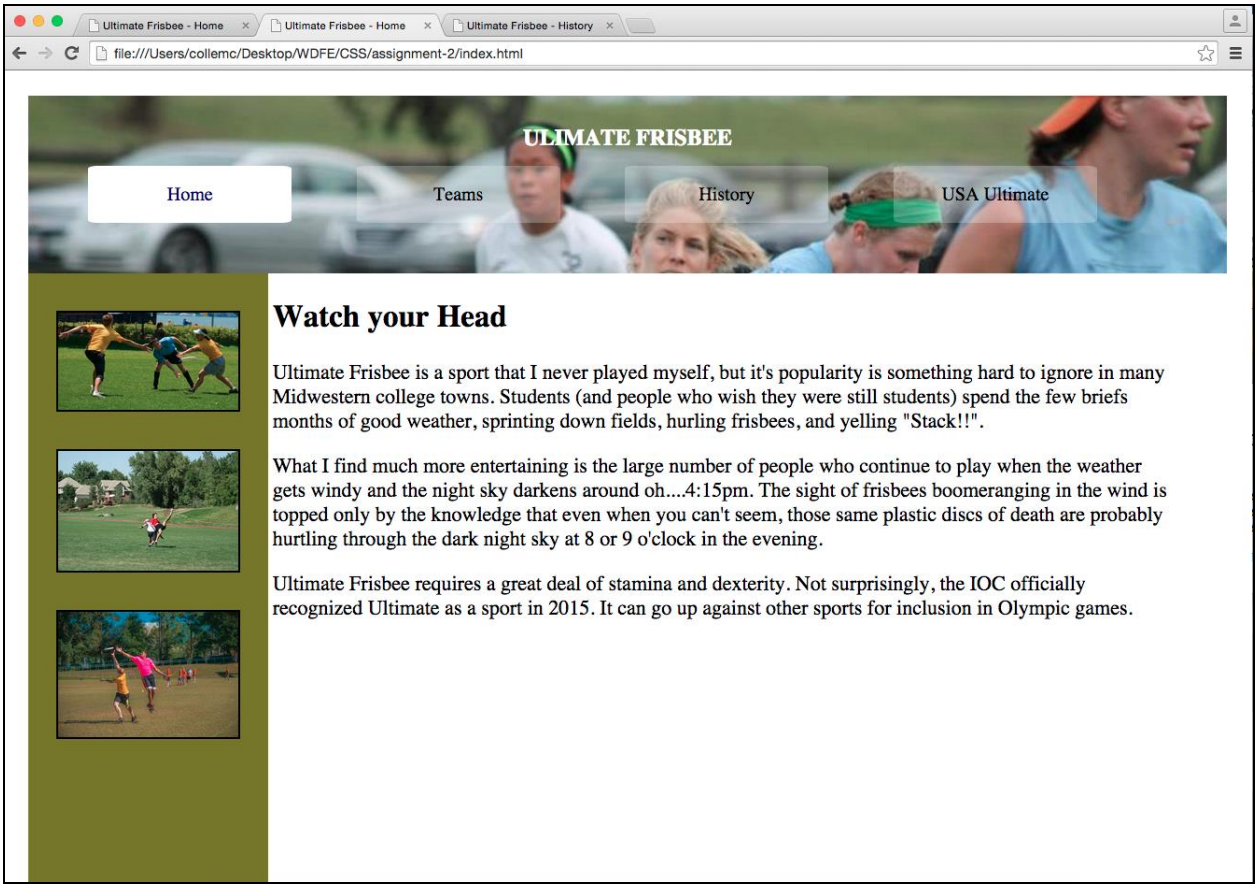
Samples for lab instructions and assignments are given below:

Creating Web Content (CSC-111)	Instructor:	Huda	Sarfraz
Lab 15: CSS Layouts	Max	Marks:	**15**
Date: **19-Dec-2018**	Time Allowed: **1 hour**		

Create a single CSS file named hw1.css for the given HTML files as per the final guidelines. A sample of the final product is given below.

1. The body should have padding and margin
2. The header should have a background color, background image (using a local image), and padding
3. The navigation links (and only the links in the navigation) should be styled with a new display, margin, border-radius, text-decoration, and padding

4. The link to the current page should be styled differently from the other links (using class = "active')
5. The sections should be next to each other, not one on top of the other.
6. The images should be part of the page now. In addition, they should have a border, be centered horizontally, and have vertical (top/bottom) space between them and the other images.



Marking guideline

- Is all formatting in a single CSS file? (1)
- Does the body have padding and or margin? (2)
- Is the header styled? (2)
- Are ONLY the links in navigation styled, not the other links? (2)
- Are the links styled? (2)
- Is the “active” class styled to clearly show which page is the current page? (2)
- Are the two sections side-by-side? (2)
- Are the images styled? (2)

Intro to Infor. & Comm. Technologies (CSC-112)	Instructor: Shazia Rizwan
Lab Test – Fall2018	Max Marks: **25**
Date : **1st Jan , 2019**	Time: **60 mins**

Instructions:

- There are ONLY two questions in this test. You have to attempt both questions. It is suggested that you must try to solve both and save frequently (either to your desktop or your Z:\ folder on server) to avoid losing your work for any reason.
- The names of your files should be **YourName-q1**, **YourName-q2**
- Submit your solution file (.rap file from RAPTOR).
- You will be marked on effort.

Submission guidelines:

- Save last 5-8 minutes for submitting your work
- You have to submit to Ms. Iqra's email ID: **iqra.iqbal7601@gmail.com**
- Subject of your email should be: **FINAL LAB TEST – ICT- FALL 2018**

Warning:

Do not leave the lab until you get a confirmation from Ms. Iqra about your submission

Question1

There are two levels/grades of employees in a company (A, B). Write a program that inputs the **salary** of an employee and his **grade**. Add 20,000 to the salary if he/she is grade **A** employee, add 10,000 to the salary if grade is **B.** If the user inputs an invalid grade, then the program should print a message **"WRONG GRADE…RUN PROGRAM AGAIN!"**. The program should print the revised salary.

{Hint: Use IF structure to complete this task}

Question 2

There are 10 students enrolled in a course. **Fee** is equal to 20,000 for next course (initial value). The course instructor wants to calulcate discounts in fee for students who have performed well in the current course.It is further required to find total number of students who have passed the course and number of students who have failed the course. A student fails if he/she has less than 60% marks in the coures. If a student has passed the course, he/she will get discount of 10% in the fee for next course.

Discount = Discount + (Fee * (10/100))

In case of a failure, no discount is provided to the student.

Required output:

Discount = **value that you have calculated**

Total Students who passed: **your value**

Total Students who failed: **your value**

Hint:

First test your loop for 4 students and if everything is working fine, then change your loop to run for 10 times.

Everytime the program runs It accepts the score of a student through input statement. It then checks if the student has passed the course or not. It then adds 1 to the appropriate counter to count number of students who have passed / failed the course.

Submission Guidelines:

Save last 5-8 minutes for submitting your work

You have to submit to Ms. Iqra's email ID: **iqra.iqbal7601@gmail.com**

Subject of your email should be : **LAB TEST – ICT- FALL 2018**

Standard 3-2: There must be adequate support personnel for instruction and maintaining the laboratories

Each of the above mentioned labs is maintained by IT Resource Center (ITRC). One Lab TA is also available to address run time issues who is responsible for keeping the hardware and software in working condition. ITRC is also required to ensure that networking of the computers is working properly and Internet is available at each workstation.

The Lab TAs assigned to faculty seek guidance from the concerned Course Instructor regarding conduct of experiments pertaining to different courses.

Standard 3-3: The University computing infrastructure and facilities must be adequate to support program's objectives.

The facilities mentioned in the above labs are adequate to support the objectives of the B.Sc. (Hons) in Computer Science program. Students of this program who are residing in the University Hostel have been provided computers which are equipped with necessary software along with Internet access.

CRITERION 4: STUDENT SUPPORT AND ADVISING

Students must have adequate support to complete the program in a timely manner and must have ample opportunity to interact with their instructors and receive timely advice about program requirements and career alternatives. To meet this criterion, the standards in this section must be satisfied.

Standard 4-1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner.

The B.Sc. (Hons) in Computer Science program comprises of forty-one (41) courses spread over four years (8 semesters) of full time study.

In each semester, normally 5-6 courses are offered which constitute a study load of 15 to 18 credit hours. Each course in the B.Sc. (Hons) in Computer Science program is offered once in an academic year, either in the Spring or Fall semester. Students may enroll in their failed courses in summers as courses as per demand are opened by the department.
Elective courses are offered depending upon the availability of the Instructor and the interest of the students.

The students of the program are also encouraged to take up elective courses from other Schools / Departments of the University. A wide range of university electives are available to choose from to satisfy their elective requirements.

Standard 4-2: Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants.

EFFECTIVE FACULTY / STUDENT INTERACTION

There is a strong interaction between Course Instructor and the students during the conduct of the course. Students are free to ask any relevant questions from the Instructor during the class as well as after class hours. Student can also communicate with the Instructor through electronic mail.

Standard 4-3: Guidance on how to complete the program must be available to all the students and access to academic advising must be available to make course decisions and career choices.

- The prospectus of the University is published every year and contains detailed information about the program. Along with study plan for each semester. Student's queries are also addressed in Orientation Session organized before the start of academic year by the School of Computer & Information Technology.
- The Head of Department of the degree program along with the Dean are available to provide guidance and counseling relating to all academic matters, as and when required. Students are free to discuss their academic and personal problems with the Dean, Faculty and Coordinator of the School.
- Every effort is made to satisfy the student's queries and provide solution to his / her problems.
- Most Visiting Faculty Members are experienced professionals and the students have opportunity to discuss their queries regarding academic and professional matters.
- By means of departmental bulletin board, and social media pages' students have updated information about seminars, workshops, conferences and other technical events in the field of Computer Science.

CRITERION 5: PROCESS CONTROL

The processes by which major functions are delivered must be in place, controlled, periodically reviewed, evaluated and continuously improved. To meet this criterion a set of standards must be satisfied.

Standard 5-1: 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.

- **PROGRAM ADMISSION CRITERIA**

✓ Applicants who have Intermediate level education (either Intermediate or A-Levels) with minimum of 50% score are eligible to apply to the B.Sc. (Hons) in Computer Science.

✓ As part of the admission process, all the applicants are required to take an Admission test and appear in an interview.

- ✓ The Registrar department verifies the certificates and degrees earned previously. It is mandatory for the applicant to pass the admission test conducted in the department. The list of accepted candidates is posted in the department as well as on the website.

- **PROGRAM/CREDIT TRANSFER**

The School refers all transfer cases to the University Equivalence Committee. The Equivalence Committee, after thorough scrutiny in light of the HEC guidelines and recommendations of the concerned department, gives approval for all transfers.

- **EVALUATION OF ADMISSION CRITERIA**

The admission criterion is reviewed annually in light of the HEC guidelines. The Board of Faculty meeting is held every year and Board of Studies meets every month to review all matters regarding the program. In addition, Academic Council of the University reviews the Admission procedure and subsequent approval is taken from the Board of Governors of the University.

Standard 5-2: 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

- **PROCESS OF REGISTRATION**

- ✓ A period of two weeks is allowed from the commencement of classes for registration of courses. A student registering for the course is responsible for ascertaining and completing the requirements of the course. Students are strongly advised to consult with their course supervisor before registering for a course
- ✓ Registration is done by filling in an online course registration form through campus management system. A printed copy is kept by the department and an SMS is issued to each student.
- ✓ Late registration is only allowed on case to case basis keeping in view any valid reason for the delay. Students are strictly discouraged to get the provision for late course registration.

- ✓ The late registration penalty of Rs. 5000/- is charged after the enrollment period. After the 4th week of the semester students are not allowed to register for a course.
- ✓

- **MONITORING STUDENTS' PROGRESS**

The student progress is carefully monitored throughout their academic stay at the School. The program follows continuous assessment procedures. The results of the students are carefully recorded and monitored by the School and passed on to the Examination and Quality Assurance department. The faculty, Head of Department and the Dean meet on a regular basis to discuss all student related issues. Attendance records, class performance records of all students are also maintained by the School. Transcripts are prepared by the examination department at the end of every semester. These transcripts are mailed to the students at the end of the semester.

- **EVALUATION AND IMPROVEMENT**

The process is evaluated by conducting regular faculty meetings in the department.

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 RECRUITEMENT PROCESS**

The School of Computer and Information Technology follows a thorough process for the recruitment of faculty in line with the BNU and HEC guidelines. The process begins with identification of faculty (preferably foreign qualified). They are then invited to give mock lectures, which are attended by the Dean and Permanent Faculty Members of the School. Based on the mock lecture, the School of Computer & Information Technology proposes their name to University HR Department so that the formal recruitment process may begin. These cases are then put before the Selection Board that interviews the candidates. On the recommendation of the Selection, the Board of Governors of BNU give the final approval.

- **FACULTY RETENTION**

Incentives for professional development are given as part of faculty retention. The University grants its faculty members up to 3 months paid leave in a year for higher studies leading to PhD. Additionally, the University grants concession in tuition fee upto 75%, in addition to full waiver in admission fee, to faculty members studying in BNU in various academic programs. Additionally, off-campus academic and training programs are also sponsored by the University.

- **FACULTY PROMOTION PROCESS**

If a faculty member in service achieves qualification and experience required for promotion at the next academic level, the respective Dean sends a recommendation to Departmental Promotion Committee which reviews the HEC guidelines for faculty appointment. In event of promotion as Assistant Professor and Associate Professor, the Committee further forwards the case to HR department of BNU. Selection Board interviews the candidate and sends recommendation to Vice Chancellor for approval. In case of promotion as Associate Professor and Professor, then the case is forwarded to Selection Board which interviews the candidate and sends its recommendation to Board of the Governors for approval.

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.

- Describe the process and procedures used to ensure that teaching and delivery of course material is effective and focus on students learning.

Course files are regularly maintained and audited to check the quality of course delivery and course progress meetings are conducted twice in each semester.

- Indicate how effectively this process is evaluated and if the evaluation results are used to improve the process.

The head of department meets with the faculty in case of any deficiency or complaint by the students.

Standard 5-5: 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 Administrative Coordinator maintains complete records of the students. These records are reviewed at the start and end of every semester to ensure the student is progressing and meeting all requirements of the program. The Registrar office maintain files on each student. These files contain past and ongoing academic record of the students. At the end of each semester these records are reviewed as a means to check student performance.

At the time of graduation, the record of each student is thoroughly scrutinized to ensure that the student has fulfilled all requirements of the program. After ensuring that all requirements have been met the student is allowed to graduate.

CRITERION 6: FACULTY

Faculty members must be current and active in their discipline and have the necessary technical depth and breadth to support the program. There must be enough faculty members to provide continuity and stability, to cover the curriculum adequately and effectively, and to allow for scholarly activities. To meet this criterion, the standards in this section must be satisfied.

Standard 6-1: 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 coursed, plan, modify and update coursed 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.

Complete the following table indicating program areas and number of faculty in each area.

Program Area of Specialization	**Courses in the Area and Avg number of sections per year**	**Number of faculty members in each area**	**Number of faculty with PhD degree**
Business Intelligence, Data Processing, Analysis and Visualization	DBMS, Data Structures, Design and Analysis of Algo., Data Mining and Warehousing, Artificial Intelligence **(1 section each)**	5	2
Web Development	Creating Web Content, Web Systems Development, Web Engineering, Mobile Computing, DBMS, Software Engineering, Adv DBMS **(1 section each)**	5	2
Artificial Intelligence	DBMS, Data Mining and Warehousing, Artificial Intelligence, Natural Language Processing **(1 section each)**	4	2
Mathematics & Science	Probability & Statistics, Discrete Mathematics, Calculus, Linear Algebra, Differential Equations, Physics, Digital Logic Design **(1 section each)**	1 permanent + 2 visiting	1 visiting
Computer Networks	Analysis of Algo., Operating Systems, Computer Networks, Info Security **(1 section each)**	4	2

Table 1.14: Faculty Distribution by Program Area

- **FACULTY RESUMES**

  CV's of all faculty members are attached in Annexure E.

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.

- All faculty members in the School of Computer and Information Technology have minimum of Master's Degree from foreign or local university. In addition, they are current in their area of expertise and have taught the courses in their domains.
- Full time faculty members are assigned a maximum load of three courses in a semester which entails 9 to 12 semester credit hour of student contact. Keeping in view this load the fulltime faculty has sufficient time for professional development. Furthermore, the fulltime faculty is not given any teaching assignments in summer and they can fully devote their summer time for professional development.
- Faculty is encouraged to participate in seminars, workshops and conferences in the area of their interest.

Standard 6-3: All faculty members should be motivated and have job satisfaction to excel in their profession.

- The faculty member is provided a congenial working environment which is conducive for teaching and research. Air-conditioned offices workstations with internet connectivity and access to digital library are standard features of the faculty working environment.
- Faculty members can purchase any book of their choice without hindrance. Faculty can also undertake professional development training and also get leave for improving their qualification at any other Institution, subject to providing a service bond.
- The performance of faculty is appraised on annual basis and they are awarded annual increment based on the appraisal.
- All the above features help in motivating the faculty in their job.

CRITERION 7: INSTITUTIONAL FACILITIES

Institutional facilities, including library, classrooms and offices must be adequate to support the objective of the program. To satisfy this criterion a number of standards must be met.

Standard 7-1: The institution must have the infrastructure to support new trends in learning such as e-learning.

- ***Please refer to Criterion 6***

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.

Professional Development

The librarians have been trained in MARC records development and cataloging in a new integrated Library System (Libxol). Further, training in the use of the software has been given. Any Archives and Records Management Course for all librarians have been trained. The need for this has arisen as a new Archives and a Records Management program has been initiated at the University.

Collection Development

A collection policy has been formulated to guide the library in its development of the collections

Library Committee

The BNU Library is guided by the Library Committee for effective management. Dean, Heads of schools are members and fd liaisons are nominated from all departments.

Annual Report

The Chief Librarian prepares an annual report to present to the Vice Chancellor of the University, highlighting the accomplishment, problems and needs of the library. Utilization of resources and statistical data is presented in this report.

Books (print form)

Total:	15114
During 2010-11:	0541
Books (Electronic):	6600
Reports:	2300
DVDs:	1056
VHS:	626
Art Catalog:	1181

Government Documents:

Pakistan Economic Survey 1980 to 2018-19

State Bank of Pakistan Report

All 5 years Plans (Soft Copy is also available)

Annual Plans (Soft Copy is also available)

50 Years Pakistan Statistics of Pakistan

Ten Years Perspective Development Plan 2001-11

Pakistan Education Policy

Pakistan Education Statistics 2007-2008

Pakistan Demographic & health Survey 2006-07

Punjab University Calendars

District Census Reports 1998

HEC Annual Reports

HEC Curriculums 2009, 2010

Judicial statistics of Pakistan Annual Reports

Vice Chancellor Reports

Punjab Development Statistics

Pakistan Engineering Congress Reports sessions 1983, 1984, 1985, 1992

Pakistan in the 21st Century: Vision 2030

Promise, Policy, Performance: Two Years of People Government

Library Budget

Annual Budget of BNU Library is Rs. 5.9 million

BNU Publications (Thesis)

Psychology	170
School of Education:	218
School of Mass Communication:	265
SSS-Economics:	25
School of Liberal Arts:	55
School of Visual Arts and Design	41
School of Architecture	167
School of Computer & IT	245
IPP Reports:	2008-16
The Maya Tree: Vol. 1	Fall 2009
Students Degree Shows:	Annually
Prospectus:	Annually
SVAD/SA Prospectus:	Annually

Faculty Catalogs	Arts Catalogs
Convocation Gazette:	1st – 13th
BNU Gazette (newsletter)	3 /years
Research Journals (Print)	18

BNU Library URL:
(http://www.bnu.edu.pk/bnu/Facilities/Library.aspx)

Library Membership:	3067
Faculty:	0153
Students:	2804
Staff:	0110

Standard 7-3: Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities.

CLASS ROOMS:

All the classrooms in the School of Computer and Information technology are air-conditioned and have multimedia projector / LCD screens to help in the teaching / learning process.
The average class size is 25 students so that instructions can be imparted to students in an effective manner.

FACULTY OFFICES:

- ***Please refer to Standard 6- 3***

CRITERION 8: INSTITUTIONAL SUPPORT

Institutional facilities, including library, classrooms and offices must be adequate to support the objectives of the program. To satisfy this criterion a number of standards are met.

Land

The total land area of Beaconhouse National University is 33 acres.

Buildings

The built-up area of the Beaconhouse National University New Campus is 322,000 sqft. In

Phase –I, the New Campus has three academic blocks, one central block and one administration block, which are all operational.

The first academic block comprising 107,000 sqft areas is operational at the New Campus. The second academic block comprising 56,000 sqft areas has been operational since September, 2011. The Administration Block comprising 32,498 sqft was made operational in December 2013. The remaining buildings are at different stages of construction.

BNU Hostel

BNU is incrementally improving on its campus and facilities with the latest addition of a purpose-built on-campus accommodation to students with state-of-the art facilities within the safe and secure environment. The construction of the hostel is in its final stages and expected to be completed by the end of year 2019.

The on-campus boarding compound will be a 42,000 sq. ft. of segregated facility for girls and boys, each with a common room, a visitor's lounge, a laundry and a warden room. A separate facility to provide accommodation for international faculty is near completion.

Roads

BNU has an internal road network of 1.5 Km. This black top road ring links network & different academic and administrative buildings. Walkways on the sides of the Parking roads have been constructed for easy movement of students and staff. Fire hydrants at different points along the road have also been provided. The New Campus in phase –It has a parking space for 400 cars. The adjoining areas of the campus can accommodate more than 600 vehicles.

Lawns & Open Spaces

BNU is an environment friendly organization. In the campus design phase special Open attention was paid to maintaining bio-diversity of the area. More than 50 % of the Spaces campus spaces have been left open and green. Each of the academic and other blocks has a lawn attached to it and is equally used by students, faculty and staff for academic and recreational purposes. The total cost of the planned landscape is Rs.10 m.

ICT

BNU's focus on information and communication. 1800 nodes system planned for the campus. Already 600 nodes are active providing the users internet connection and IP telephony facility. This back bone is also meant for IP surveillance and access control systems for the buildings.

Computer Labs

All computer labs with access to Internet, scanning and printing (color & b/w) from 9:00 am to 6:30 pm daily Monday to Friday.

Library

The BNU Library remains open from 9:00 a.m. – 6:30 p.m. daily, Monday to Friday and for a specific number of hours on Saturday as well. A full time librarian and assistants provide library information and access.

Sports Club

BNU encourages student participation in extracurricular activities and regularly hosts concerts, exhibitions, film screenings and other cultural events.

The Sports Club of BNU promotes sports activities among the students by organizing matches throughout the year among different departments as well as with other universities and colleges.

Cafeteria and Resource Center

The BNU cafeteria block is a three story well-furnished facility spread on 18000 sq. ft. area and with seating capacity for over 3000 persons at a time. The basement and the ground floor are completely operational while the upper ground floor is reserved for special occasions and gala buffet events.

A cafeteria quality assurance committee with representatives from faculty and management ensures maintenance of highest standards in quality and hygiene and diversity of cuisine at economical prices through surprise visits and regular in-person meetings with the cafeteria management and staff. Periodic medical health examination and diagnostic tests of chefs and waiters is conducted.

There are separate counters and stations for Fast Food, Pizza, Pakistani, Chinese, Open Kitchen, besides separate bars for Fresh Juices Milkshakes, Tea/Coffee provide a variety of hold and cold drinks. In addition, the café has a tuck shop for routine purchasable items.

The on-campus resource center caters to students' requirements for printing, stationary and photocopying services etc. Photocopying facilities are available at cost five days a week, 9:00 a.m. – 6:30 p.m. daily.

Student & Alumni Affairs

The Student Affairs Office under the Directorate of Student Affairs and External Relations coordinates with university's non-academic units for timely resolution of issues brought up by students (cafeteria, transport, hostels and related matters) besides providing support in holding co-curricular activities and ensuring students' co-curricular participation at events outside the university. It also maintains liaison with the university's alumni for their facilitation and assistance wherever needed.

The responsibilities of the department are as follows:

a) Conduct orientation and guidance services for new entrants to acquaint them with University life and rules.

b) Attend to student grievances and provide support for early resolution of student problems and issues.

c) Support and facilitate co-curricular activities by student society's and clubs such as BNU Bestival, BNU Model United Nations (BUMUN) etc.

d) Maintain the alumni network (graduate email database) and organize on-campus activities including meet-ups and homecomings.

Virtual Health Center

BNU offers a primary care facility to its students, faculty and staff through its on-campus Virtual Health Centre (VHC) in partnership between iHeal and Cloudclinik. The Clinic provides services of regular checkup and basic medical screening to BNU faculty, staff and students. The Clinic is manned by trained nursing staff with the availability of an online panel of general physicians where patients can connect with them face-to-face in real-time via video screen upon request or requirement.

The purpose of VHC is to provide primary care on campus, screen for underlying risks for diabetes and hypertension, provide medical advice, monitor and manage basic health and refer to specialist care where required.

Students can get their Blood Pressure, Blood Sugar, Body Mass Index (BMI), Body Temperature, Pulse and Eye Vision evaluated. VHC then creates a wellness profile of each student against a unique ID number which is stored with the Clinic for future visits. Based on any irregularities, a student may be advised appropriate course of action by the medical team.

All screenings and visits to the clinic are optional and free-of-cost for students.

Center for Counseling and Psychological Well-being

BNU considers the emotional health of student and staff as its top priority. It has established an on-campus Center for Counseling and Psychological Well-being with support from BNU Institute of Psychology. The center aims to provide students with services to help them gain and maintain psychological well-being, featuring a qualified Psychologist on board as the Campus Counselor.

Students can seek help from our trained professional in complete confidence regarding any personal, social or other crises they may be facing and discuss the same in a supportive and secure environment.
The aim of the Center is to encourage students' personal, academic & social growth, enhance their problem-solving and decision-making capabilities and to ultimately enable them to face various life challenges in a wholesome manner.

Career Placement Office

BNU has established a Career Placement Office under the Directorate of Student Affairs and External Relations that serves Career Placement needs of students and graduates. The services include academic counseling, professional counseling, job placement, internship facilitation and enabling students for self-employment and start-up business opportunities.
The responsibilities of this department include the following services:

- **a)** Undertake career counseling of prospective applicants as well as parents during admissions cycle.
- **b)** Provide career guidance services to students, facilitate internship programs and build liaison with industry for job placements.
- **c)** Conduct Job Fairs, Recruitment Drives, Employer Meet-ups, and Screening Interviews for graduates and graduating students.
- **d)** Develop and maintain a graduate directory of recent graduates.
- **e)** Liaise with the United States Education Foundation in Pakistan and British Council, UK and explore other international education opportunities for students and keeping them informed on international fellowships and scholarship programs.
- **f)** Extend support for international exchange semesters and summer (Turkey, USA, Germany etc.)
- **g)** Facilitate start-up incubation at Plan9 Technology Incubator, The Indus Entrepreneurs (TiE) Lahore Chapter, NetSol Nspire Program, National Incubation Center, The Nest I/O, WomenXPakistan for mentoring of students and alumni to capitalize on their entrepreneurial potential.

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.

- The faculty of School of Computer and Information Technology is provided market based salaries along with standard service benefits i.e. Provident Fund, Annual Leave, Medical Leave, and Medical Insurance.

- The Institute has sufficient budgeted fund to support the faculty. The Institution also has funds to support faculty needs for teaching and research purposes.
- The School of Computer and Information Technology has two Coordinators to handle all Administrative and Coordination tasks, so that the faculty can concentrate on teaching and research.

Standard 8-2: There must be an adequate number of high quality graduate students, research assistants and Ph. D. students.

The School of Computer and Information Technology does not have Master Program therefore, there are no graduate students.

Standard 8-3: Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities

LIBRARY

- ***Please refer to Standard 7- 2***

LABORATORY

- ***Please refer to Criterion 3***

COMPUTING FACILITIES

- ***Please refer to Standard 2- 1***

Criterion 1 - Program Mission, Objectives and Outcomes	Weight = 0.05				
	Score				
	5	4	3	2	1
Does the program have documented outcomes for graduating students?	5				
Do these outcomes support the program objectives?	5				
Are the graduating students capable of performing these outcomes?		4			
Does the department assess its overall performance periodically using quantifiable measures?			3		
Is the result of the program assessment documented?			3		
Total Encircled Value (TV)	**20**				
Score 1 (S1) = {TV / (No. of Questions * 5)} * 100 * Weight	**4.00**				

Criterion 2 - Curriculum Design and Organization	Weight = 0.20				
	Score				
	5	4	3	2	1
Is the curriculum consistent?	5				
Does the curriculum support the program's documented objectives?	5				
Are theoretical background, problem analysis and solution design stressed within the program's core material	5				
Does the curriculum satisfy the core requirements laid down by respective accreditation bodies? (Refer to appendix A of the Self-Assessment Report Manual)	5				
Does the curriculum satisfy the major requirements laid down by HEC and the respective councils / accreditation bodies? (Refer to appendix A of Self-Assessment Manual)	5				

Does the curriculum satisfy the general education, arts and professional and other discipline requirements as laid down by the respective body / councils? (Refer to appendix A of Self-Assessment Manual)	5				
Is the information technology component integrated throughout the program?	5				
Are oral and written skills of the students developed and applied in the program?	5				
Total Encircled Value (TV)	**40**				
Score 2 (S2) = {TV / (No. of Questions * 5)} * 100 * Weight	**20.00**				

Criterion 3 - Laboratories and Computing Facilities	**Weight = 0.10**				
	Score				
	5	**4**	**3**	**2**	**1**
Are laboratory manuals / documentation / instructions etc. for experiments available and ready accessible of faculty and students?		4			
Are there adequate number of support personnel for instruction and maintaining the laboratories?		4			
Are the University's infrastructure and facilities adequate to support the program's objectives?		4			
Total Encircled Value (TV)	**12**				
Score 3 (S3) = {TV / (No. of Questions * 5)} * 100 * Weight	**8.0**				

Criterion 4 - Student Support and Advising	**Weight = 0.10**				
	Score				
	5	**4**	**3**	**2**	**1**
Are the courses being offered in sufficient frequency and number for the students to complete the program in a timely manner?	5				
Are the courses in the major area structured to optimize interaction between the students, faculty and teaching assistants?	5				
Does the University provide academic advising on course decisions and career choices to all students?	5				
Total Encircled Value (TV)	**15**				
Score 4 (S4) = {TV / (No. of Questions * 5)} * 100 * Weight	**10**				

Criterion 5 - Process Control	Weight = 0.15				
	Score				
	5	4	3	2	1
Is the process to enroll students to a program based on quantitative and qualitative criteria?	5				
Is the process above clearly documented and periodically evaluated to ensure that it is meeting its objectives?	5				
Is the process to register students in the program and monitoring their progress documented?		4			
Is the process above periodically evaluated to ensure that it is meeting its objectives?	5				
Is the process to recruit and retain faculty in place and documented?	5				
Are the processes for faculty evolution & promotion consistent with the institution mission?		4			
Are the processes in 5 and 6 above periodically evaluated to ensure that they are meeting their objectives?		4			
Do the processes and procedures ensure that teaching and delivery of course material emphasize active learning and that course learning outcomes are met?	5				
Is the process in 8 above periodically evaluated to ensure that it is meeting its objectives?	5				
Is the process to ensure that graduates have completed the requirements of the program based on standards and documented procedures?	5				
Is the process in 10 above periodically evaluated to ensure that it is meeting its objectives?	5				
Total Encircled Value (TV)	**52**				

Score 5 (S5) = {TV / (No. of Questions * 5)} * 100 * Weight	**14.18**

Criterion 6 - Faculty	**Weight = 0.20**				
	Score				
	5	**4**	**3**	**2**	**1**
Are there enough full time faculty members to provide adequate coverage of the program areas / courses with continuity and stability?	5				
Are the qualifications and interests of faculty members sufficient to teach all courses, plan, modify and update courses and curricula?	5				
Do the faculty members possess a level of competence that would be obtained through graduate work in the discipline?	5				
Do the majority of faculty members hold Ph.D. degree in their discipline?			3		
Do faculty members dedicate sufficient time to research to remain current in their disciplines?			3		
Are there mechanisms in place for faculty development?			3		
Are faculty members motivated and satisfied so as to excel in their professions?		4			
Total Encircled Value (TV)	**28**				
Score 6 (S6) = {TV / (No. of Questions * 5)} * 100 * Weight	**16.0**				

Criterion 7 -Institutional Facilities	**Weight = 0.10**				
	Score				
	5	**4**	**3**	**2**	**1**

Does the institution have the infrastructure to support new trends such as e-learning?				2	
Does the library contain technical collection relevant to the program and is it adequately staffed?			3		
Are the class rooms and offices adequately equipped and capable of helping faculty carry out their responsibilities?	5				
Total Encircled Value (TV)	**10**				
Score 7 (S7) = {TV / (No. of Questions * 5)} * 100 * Weight			**6.67**		

Criterion 8 - Institutional Support	**Weight = 0.10**				
	Score				
	5	**4**	**3**	**2**	**1**
Is there sufficient support and finances to attract and retain high quality faculty?	5				
Are there an adequate number of high quality graduate students, teaching assistants and PhD students?					1
Total Encircled Value (TV)	**6**				
Score 8 (S8) = {TV / (No. of Questions * 5)} * 100 * Weight			**6.0**		

Overall Assessment Score = S1 + S2 + S3 + S4 + S5 + S6 + S7 + S8 = 4 + 20 + 8 + 10 + 14.18 + 16+ 6.67 + 6	**84.85**

APPENDICES

Annexure A

Inventory List System Unit Lab Room 311 Computer Lab

Sr. No	BNU Fixed Asset Code/Serial Number	Item Description	Model No	Year of Purchase	Location
1	NH9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
2	3N9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
3	GL9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
4	1N9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
5	3M9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
6	8K9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
7	3M9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
8	4P9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
9	DN9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
10	8M9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
11	Q19ZY42	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
12	4N9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
13	JM9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
14	HN9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
15	9M9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
16	3P9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
17	3Z9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
18	5M9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
19	DLPTQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
20	7M9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
21	CN9TQ12	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
22	202P622	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
23	552P622	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
24	ZNZN622	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
25	3B9FY4L	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311

26	2S1P622	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
27	362P622	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
28	9S8ZY42	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	Dell OPTIPLEX 3020 MT(New)	2014	Lab 311
29	JBDM862	Intel core i5	Dell Optiplex 3020 7th Gen	2017	Lab 311
30	JBDL862	Intel core i5	Dell Optiplex 3020 7th Gen	2017	Lab 311

Inventory List Monitor Lab 311

Sr. NO	BNU fixed Asset Code / Serial	Model No	Location
1	CN-01NP7T-64180-45L-OCWU	Dell E Series 19" E1913	Lab 311
2	CN-01NP7T-64180-45L-OCFU	Dell E Series 19" E1913	Lab 311
3	CN-01NP7T-64180-45L-OCLU	Dell E Series 19" E1913	Lab 311
4	CN-01NP7T-64180-45L-OBRU	Dell E Series 19" E1913	Lab 311
5	CN-01NP7T-64180-45L-O1CL	Dell E Series 19" E1913	Lab 311
6	CN-01NP7T-64180-45L-OCKU	Dell E Series 19" E1913	Lab 311
7	CN-01NP7T-64180-45L-OBQU	Dell E Series 19" E1913	Lab 311
8	CN-01NP7T-64180-45L-OCJU	Dell E Series 19" E1913	Lab 311
9	CN-01NP7T-64180-45L-OBGU	Dell E Series 19" E1913	Lab 311
10	CN-01NP7T-64180-45L-ONBU	Dell E Series 19" E1913	Lab 311
11	CN-01NP7T-64180-45L-019L	Dell E Series 19" E1913	Lab 311
12	CN-01NP7T-64180-45L-01BL	Dell E Series 19" E1913	Lab 311
13	GRF-UNI-12-12-9-27	ACER	Lab 311
14	NDE6HMDZ802348A	Samsung	Lab 311
15	CN-01NP7T-64180-45L-OBPU	Dell E Series 19" E1913	Lab 311
16	CN-01NP7T-64180-45L-OBVU	Dell E Series 19" E1913	Lab 311
17	O1NPT7T-64180-45L-0NPU	Dell E Series 19" E1913	Lab 311
18	GRF-UNI-12-12-7-29	ACER	Lab 311
19	UNI-1-09-38-36	Dell E-1709WC 17"	Lab 311
20	UNI-10-09-38-37	Dell E-1709WC 17"	Lab 311
21	CN-01NP7T-64180-45L-O1FL	Dell E Series 19" E1913	Lab 311
22	CN-01NP7T-64180-45L-OOXL	Dell E Series 19" E1913	Lab 311
23	UNI-10-09-38-40	Dell E-1709WC 17"	Lab 311
24	O1NPT7T-64180-45L-OCTU	Dell E Series 19" E1913	Lab 311
25	GRF-UNI-9-11-5-5	Samsung	Lab 311
26	UNI-10-09-38-44	Dell E-1709WC 17"	Lab 311
27	GRF-UNI-9-11-5-8	Samsung	Lab 311
28	UNI-10-09-38-33	Dell E-1709WC 17"	Lab 311
29	GRF-UNI-05-12-7-16	HP	Lab 311
30	GRF-UNI-5-12-7-7	HP	Lab 311

Annexure B

Inventory List System Unit Computer Lab Room 314

Sr. No	BNU Fixed Asset Code	Item Description	Model No	Year of Purchase	Location
1	UNI-06-14-52-40	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
2	UNI-06-14-52-39	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
3	UNI-06-14-52-38	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
4	UNI-06-14-52-37	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
5	UNI-06-14-52-36	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
6	UNI-06-14-52-35	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
7	UNI-12-12-22-4	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 314
8	UNI-06-14-52-41	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
9	UNI-06-14-52-42	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
10	UNI-06-14-52-43	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
11	UNI-06-14-52-44	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
12	UNI-06-14-52-45	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
13	UNI-06-14-52-46	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
14	UNI-06-14-52-47	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
15	UNI-06-14-52-48	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
16	UNI-06-14-52-49	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
17	UNI-06-14-52-50	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
18	UNI-06-14-52-51	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
19	UNI-09-14-03-14	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
20	UNI-06-14-52-53	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
21	UNI-06-14-52-54	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
22	UNI-06-14-52-55	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
23	UNI-06-14-52-56	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
24	UNI-9-14-3-19	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314

25	UNI-06-14-52-58	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
26	UNI-06-14-52-59	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
27	UNI-9-14-3-18	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
28	UNI-9-14-3-13	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
29	UNI-06-14-52-57	Intel core i5 3.20 GHZ 4GB 500 HDD, Super drive	OPTIPLEX 3010 (New)	2013	Lab 314
30	JBDZBD2	Intel core i5	Dell 3050 New	2017	Lab 314
31	JBFC1H2	Intel core i5	Dell 3050 New	2017	Lab 314
32	JBFP7C2	Intel core i5	Dell 3050 New	2017	Lab 314
33	JBDH7C2	Intel core i5	Dell 3050 New	2017	Lab 314
34	JBDJ8F2	Intel core i5	Dell 3050 New	2017	Lab 314
35	JBD8HJ2	Intel core i5	Dell 3050 New	2017	Lab 314
36	JBFLH62	Intel core i5	Dell 3050 New	2017	Lab 314
37	JB1TF2	Intel core i5	Dell 3050 New	2017	Lab 314

Inventory List Monitor Lab Room 314

Sr. NO	BNU fixed Asset Code / Serial	Model No	Location
1	UNI-06-14-52-65	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
2	UNI-06-14-52-64	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
3	UNI-06-14-52-63	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
4	UNI-06-14-52-62	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
5	UNI-06-14-52-60	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
6	UNI-10-09-38-24	Dell E-1709WC 17"	Lab 314
7	UNI-06-14-52-61	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
8	UNI-06-14-52-66	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
9	UNI-06-14-52-67	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
10	UNI-06-14-52-68	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
11	UNI-06-14-52-69	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
12	UNI-06-14-52-70	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
13	UNI-06-14-52-71	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
14	UNI-06-14-52-72	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
15	UNI-06-14-52-73	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
16	UNI-06-14-52-47	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
17	UNI-06-14-52-75	Dell E-Series E1912H 18.5" LED	Lab 314

		Monitor	
18	UNI-06-14-52-76	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
19	UNI-06-14-52-77	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
20	UNI-06-14-52-78	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
21	UNI-06-14-52-79	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
22	UNI-06-14-52-80	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
23	UNI-06-14-52-81	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
24	UNI-06-14-52-82	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
25	UNI-06-14-52-83	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
26	UNI-06-14-52-84	Dell E-Series E1912H 18.5" LED Monitor	Lab 314
27	UNI-10-09-38-27	Dell E-1709WC 17"	Lab 314
28	UNI-10-09-38-28	Dell E-1709WC 17"	Lab 314
29	UNI-10-09-38-29	Dell E-1709WC 17"	Lab 314
30	UNI-10-09-38-30	Dell E-1709WC 17"	Lab 314
31	UNI-10-09-38-31	Dell E-1709WC 17"	Lab 314
32	GRF-UNI-05-12-7-1	HP	Lab 314
33	GRF-UNI-05-12-7-2	HP	Lab 314
34	GRF-UNI-05-12-7-5	HP	Lab 314
35	GRF-UNI-05-12-7-19	HP	Lab 314
36	GRF-UNI-05-12-7-3	HP	Lab 314
37	UNI-6-14-52-16	Dell E-Series E1912H 18.5" LED Monitor	Lab 314

Annexure C

1. Lab Equipment

S.No.	Product Name	Serial Number	Asset Code	Model No	Quantity	USER	LOCATION
1	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-1	IT-300	01	Digital Lab	B-3 Basement
2	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-2	IT-300	01	Digital Lab	B-3 Basement
3	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-3	IT-300	01	Digital Lab	B-3 Basement
4	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-4	IT-300	01	Digital Lab	B-3 Basement
5	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-5	IT-300	01	Digital Lab	B-3 Basement
6	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-6	IT-300	01	Digital Lab	B-3 Basement
7	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-7	IT-300	01	Digital Lab	B-3 Basement
8	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-8	IT-300	01	Digital Lab	B-3 Basement
9	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-9	8086	01	Digital Lab	B-3 Basement
10	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-10	8086	01	Digital Lab	B-3 Basement
11	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-11	8086	01	Digital Lab	B-3 Basement
12	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-12	8086	01	Digital Lab	B-3 Basement
13	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-13	8086	01	Digital Lab	B-3 Basement
14	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-14	8086	01	Digital Lab	B-3 Basement
15	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-15	8086	01	Digital Lab	B-3 Basement
16	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-16	8086	01	Digital Lab	B-3 Basement
17	DIGITAL MULTIMETERS INSTEK	9400764	GRF-UNI-12-5-10-5	DM-8034	01	Digital Lab	B-3 Basement
18	DIGITAL MULTIMETERS INSTEK	9400774	GRF-UNI-12-5-10-6	DM-8034	01	Digital Lab	B-3 Basement
19	DIGITAL MULTIMETERS INSTEK	9400773	GRF-UNI-12-5-10-4	DM-8034	01	Digital Lab	B-3 Basement
20	KAISE DIGITAL MULTIMETERS NU-TL-24	--	GRF-UNI-12-05-10-8	---	01	Digital Lab	B-3 Basement
21	KAISE DIGITAL MULTIMETERS NU-TL-23	--	GRF-UNI-12-05-10-07	--	01	Digital Lab	B-3 Basement
22	KAISE DIGITAL MULTIMETRES NU-TL-25	--	GRF-UNI-12-05-10-09	--	01	Digital Lab	B-3 Basement
23	DIGITAL MULTIMETERS CT			DT830D	01	Digital Lab	B-3 Basement
24	DIGITAL MULTIMETERS CT			DT830D	01	Digital Lab	B-3 Basement
25	OSCILLISCOPES 20 MHZ	10050298	GRF-UNI-12-	CS-4125A	01	Digital Lab	B-3 Basement

			05-10-10				
26	OSCILLISCOPES 20 MHZ	10050231	GRF-UNI-12-05-10-11	CS-4125A	01	Digital Lab	B-3 Basement
27	OSCILLISCOPES 20 MHZ	10050296	GRF-UNI-12-05-10-12	CS-4125A	01	Digital Lab	B-3 Basement
28	DUAL POWERSUPPLY 0-30 V SCHENZHEN MASTECH	022503713	GRF-UNI-12-05-10-13	HY3003S-3	01	Digital Lab	B-3 Basement
29	DUAL POWERSUPPLY 0-30 V SCHENZHEN MASTECH	022503708	GRF-UNI-12-05-10-14	HY3003S-3	01	Digital Lab	B-3 Basement

2.Integrated Circuits

Sr.No.	NAME	QUANTITY	USER	ROOM LOCATION
1	NOR GATE 74LS02	12	Digital Lab	B-3 Basement
2	AND GATE 74LS08	12	Digital Lab	B-3 Basement
3	MULTIPLEXER 74LS5157	12	Digital Lab	B-3 Basement
4	NOT GATE 74LS04	12	Digital Lab	B-3 Basement
5	NAND GATE IC74L500	12	Digital Lab	B-3 Basement
6	XOR 74LS85	12	Digital Lab	B-3 Basement
7	OR GATE 74LS32	12	Digital Lab	B-3 Basement
8	BCD DECODER 74LS47	12	Digital Lab	B-3 Basement
9	OP-AMP MA741	2	Digital Lab	B-3 Basement
10	DEORDER 74LS139	12	Digital Lab	B-3 Basement

3. Passive Components

SR. NO.	NAME	QUANTITY	USER	ROOM LOCATION
1	1K Ohms Resistors	50	Digital Lab	B-3 Basement
2	7-segment displays	12	Digital Lab	B-3 Basement
3	Alligator Pins	12	Digital Lab	B-3 Basement
4	Compass	5	Digital Lab	B-3 Basement
5	180 Ohms Resistors	50	Digital Lab	B-3 Basement
6	470k 270	12	Digital Lab	B-3 Basement
7	1.2 K	50	Digital Lab	B-3 Basement
8	2.7 K	5	Digital Lab	B-3 Basement
9	56K-1M	12	Digital Lab	B-3 Basement
10	12K, 82K	2	Digital Lab	B-3 Basement
11	33K, 2.2 K	12	Digital Lab	B-3 Basement
12	39K, 68K,	24	Digital Lab	B-3 Basement
13	220,1.8K	8	Digital Lab	B-3 Basement
14	10-K 1 WATT	30	Digital Lab	B-3 Basement
15	100-K	06	Digital Lab	B-3 Basement
16	35 MH	05	Digital Lab	B-3 Basement
17	2.2K	03	Digital Lab	B-3 Basement
18	1K	04	Digital Lab	B-3 Basement
19	4.7 K	06	Digital Lab	B-3 Basement
20	330	01	Digital Lab	B-3 Basement
21	SWITCHES	05	Digital Lab	B-3 Basement
22	82K , 470K	11	Digital Lab	B-3 Basement
23	10K POTENTIOMETER	03	Digital Lab	B-3 Basement
24	5K POTENTIOMETER	18	Digital Lab	B-3 Basement

25	0.22 MF, 154F	48	Digital Lab	B-3 Basement
26	0.47MF, 50V, 0.1MF, 50V	09	Digital Lab	B-3 Basement
27	10	04	Digital Lab	B-3 Basement
28	PNP BJT, 2N3906, NPN2N3904	22	Digital Lab	B-3 Basement
29	GPDIODES 1N914	08	Digital Lab	B-3 Basement
30	ZENER GP1N753	12	Digital Lab	B-3 Basement
31	330MF, 10MF	37	Digital Lab	B-3 Basement
32	22MF, 270MF	30	Digital Lab	B-3 Basement

4. Wiring Accessories

S.NO	NAME	QUANTITY	USER	ROOM LOCATION
1	WIRE CUTTER	08	Digital Lab	B-3 Basement
2	PLIERS	08	Digital Lab	B-3 Basement
3	POWER CABLES	16	Digital Lab	B-3 Basement
4	DIGITAL TRAINERS CABLES	64	Digital Lab	B-3 Basement
5	KAVIA STAND	01	Digital Lab	B-3 Basement
6	KAVIA STAND	01	Digital Lab	B-3 Basement
7	KAVIA STAND	01	Digital Lab	B-3 Basement

5. Manuals

S.NO.	Name	Quantity	User	Room Location
1	Microprocessor Training System (8086) IT-4320 Experimental Manual	08	Digital Lab	B-3 Basement
2	Digital Logic Training System IT-300 Experimental Manual	08	Digital Lab	B-3 Basement
3	Digital Logic Training System IT-300 User Manual	08	Digital Lab	B-3 Basement

System Unit Inventory List

Sr. No	BNU Fixed Asset Code	Item Description	Model No	Year of Purchase	Location
1	UNI-10-09-26-15	Intel GX280, 2GB ,80GB HDD	Dell GX280 P4	2010	B-3 Basement
2	NU-CMP-227-06-07	Intel GX240, 2GB ,80GB HDD	Dell GX240 P4	2010	B-3 Basement
3	UNI-10-09-38-18	Intel GX280, 2GB ,80GB HDD	Dell GX280 P4	2010	B-3 Basement
4	UNI-10-09-38-09	Intel GX280, 2GB ,80GB HDD	Dell GX280 P4	2010	B-3 Basement

Note:

In Lab B-3, there is no LCD. Only system unit is available with keyboard mouse and power cables.

Annexure D

1. Lab Equipment

Sr.No.	Product Name	Serial Number	Asset Code	Model No	Quantity	USER	LOCATION
1	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-1	IT-300	01	Digital Lab	B-3
2	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-2	IT-300	01	Digital Lab	B-3
3	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-3	IT-300	01	Digital Lab	B-3
4	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-4	IT-300	01	Digital Lab	B-3
5	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-5	IT-300	01	Digital Lab	B-3
6	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-6	IT-300	01	Digital Lab	B-3
7	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-7	IT-300	01	Digital Lab	B-3
8	DIGITAL TRAINER	IT-300	GRF-UNI-04-14-2-8	IT-300	01	Digital Lab	B-3
9	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-9	8086	01	Digital Lab	B-3
10	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-10	8086	01	Digital Lab	B-3
11	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-11	8086	01	Digital Lab	B-3
12	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-12	8086	01	Digital Lab	B-3
13	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-13	8086	01	Digital Lab	B-3
14	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-14	8086	01	Digital Lab	B-3
15	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-15	8086	01	Digital Lab	B-3
16	MICROPROCESSOR TRAINER	IT-4320	GRF-UNI-04-14-2-16	8086	01	Digital Lab	B-3
17	DIGITAL MULTIMETERS INSTEK	9400764	GRF-UNI-12-5-10-5	DM-8034	01	Digital Lab	B-3
18	DIGITAL MULTIMETERS INSTEK	9400774	GRF-UNI-12-5-10-6	DM-8034	01	Digital Lab	B-3
19	DIGITAL MULTIMETERS INSTEK	9400773	GRF-UNI-12-5-10-4	DM-8034	01	Digital Lab	B-3
20	KAISE DIGITAL MULTIMETERS NU-TL-24	--	GRF-UNI-12-05-10-8	---	01	Digital Lab	B-3
21	KAISE DIGITAL MULTIMETERS NU-TL-23	--	GRF-UNI-12-05-10-07	--	01	Digital Lab	B-3
22	KAISE DIGITAL MULTIMETRES NU-TL-25	--	GRF-UNI-12-05-10-09	--	01	Digital Lab	B-3
23	DIGITAL MULTIMETERS CT			DT830D	01	Digital Lab	B-3
24	DIGITAL MULTIMETERS CT			DT830D	01	Digital Lab	B-3

25	OSCILLISCOPES 20 MHZ	10050298	GRF-UNI-12-05-10-10	CS-4125A	01	Digital Lab	B-3
26	OSCILLISCOPES 20 MHZ	10050231	GRF-UNI-12-05-10-11	CS-4125A	01	Digital Lab	B-3
27	OSCILLISCOPES 20 MHZ	10050296	GRF-UNI-12-05-10-12	CS-4125A	01	Digital Lab	B-3
28	DUAL POWERSUPPLY 0-30 V SCHENZHEN MASTECH	022503713	GRF-UNI-12-05-10-13	HY3003S-3	01	Digital Lab	B-3
29	DUAL POWERSUPPLY 0-30 V SCHENZHEN MASTECH	022503708	GRF-UNI-12-05-10-14	HY3003S-3	01	Digital Lab	B-3

2. Integrated Circuits

Sr.No.	NAME	QUANTITY	USER	ROOM LOCATION
1	NOR GATE 74LS02	12	Digital Lab	B-3
2	AND GATE 74LS08	12	Digital Lab	B-3
3	MULTIPLEXER 74LS5157	12	Digital Lab	B-3
4	NOT GATE 74LS04	12	Digital Lab	B-3
5	NAND GATE IC74L500	12	Digital Lab	B-3
6	XOR 74LS85	12	Digital Lab	B-3
7	OR GATE 74LS32	12	Digital Lab	B-3
8	BCD DECODER 74LS47	12	Digital Lab	B-3
9	OP-AMP MA741	2	Digital Lab	B-3
10	DEORDER 74LS139	12	Digital Lab	B-3

3. Passive Components

SR. NO.	NAME	QUANTITY	USER	ROOM LOCATION
1	1K Ohms Resistors	50	Digital Lab	B-3
2	7-segment displays	12	Digital Lab	B-3
3	Alligator Pins	12	Digital Lab	B-3
4	Compass	5	Digital Lab	B-3
5	180 Ohms Resistors	50	Digital Lab	B-3
6	470k 270	12	Digital Lab	B-3
7	1.2 K	50	Digital Lab	B-3
8	2.7 K	5	Digital Lab	B-3
9	56K-1M	12	Digital Lab	B-3
10	12K, 82K	2	Digital Lab	B-3
11	33K, 2.2 K	12	Digital Lab	B-3
12	39K, 68K,	24	Digital Lab	B-3
13	220,1.8K	8	Digital Lab	B-3
14	10-K 1 WATT	30	Digital Lab	B-3
15	100-K	06	Digital Lab	B-3
16	35 MH	05	Digital Lab	B-3
17	2.2K	03	Digital Lab	B-3
18	1K	04	Digital Lab	B-3
19	4.7 K	06	Digital Lab	B-3
20	330	01	Digital Lab	B-3
21	SWITCHES	05	Digital Lab	B-3
22	82K , 470K	11	Digital Lab	B-3

23	10K POTENTIOMETER	03	Digital Lab	B-3
24	5K POTENTIOMETER	18	Digital Lab	B-3
25	0.22 MF, 154F	48	Digital Lab	B-3
26	0.47MF, 50V, 0.1MF, 50V	09	Digital Lab	B-3
27	10	04	Digital Lab	B-3
28	PNP BJT, 2N3906, NPN2N3904	22	Digital Lab	B-3
29	GPDIODES 1N914	08	Digital Lab	B-3
30	ZENER GP1N753	12	Digital Lab	B-3
31	330MF, 10MF	37	Digital Lab	B-3
32	22MF, 270MF	30	Digital Lab	B-3

4. Wiring Accessories

S.NO	NAME	QUANTITY	USER	ROOM LOCATION
1	WIRE CUTTER	08	Digital Lab	B-3
2	PLIERS	08	Digital Lab	B-3
3	POWER CABLES	16	Digital Lab	B-3
4	DIGITAL TRAINERS CABLES	64	Digital Lab	B-3
5	KAVIA STAND	01	Digital Lab	B-3
6	KAVIA STAND	01	Digital Lab	B-3
7	KAVIA STAND	01	Digital Lab	B-3

5. Manuals

S.NO.	Name	Quantity	User	Room Location
1	Microprocessor Training System (8086) IT-4320 Experimental Manual	08	Digital Lab	B-3
2	Digital Logic Training System IT-300 Experimental Manual	08	Digital Lab	B-3
3	Digital Logic Training System IT-300 User Manual	08	Digital Lab	B-3

System Unit Inventory List

Sr. No	BNU Fixed Asset Code	Item Description	Model No	Year of Purchase	Location
1	UNI-9-11-05-4	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
2	UNI-9-11-05-3	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
3	UNI-9-11-05-2	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
4	UNI-12-12-22-3	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
5	UNI-9-12-25-13	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
6	UNI-9-11-05-1	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
7	UNI-9-12-25-14	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308

8	UNI-12-12-22-5	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
9	UNI-12-12-22-6	Intel Core 2 Duo CPU 2.20GHZ, 2GB ,500GB HDD	OptiPlex 745	2012	Lab 308
10	DWMQ52S	Intel Core 2 Duo CPU 2.20GHZ, 1GB ,100GB HDD	Dell		Lab 308
11	FZDD82S	Intel Core 2 Duo CPU 2.20GHZ, 1GB ,100GB HDD	Dell		Lab 308
12	5YDD82S	Intel Core 2 Duo CPU 2.20GHZ, 1GB ,100GB HDD	Dell		Lab 308
13	BXMQ52S	Intel Core 2 Duo CPU 2.20GHZ, 1GB ,100GB HDD	Dell		Lab 308
14	8YDD82S	Intel Core 2 Duo CPU 2.20GHZ, 1GB ,100GB HDD	Dell		Lab 308
15	BWMQ52S	Intel Core 2 Duo CPU 2.20GHZ, 1GB ,100GB HDD	Dell		Lab 308
16	ZVMQ52S	Intel Core 2 Duo CPU 2.20GHZ, 1GB ,100GB HDD	Dell		Lab 308

Inventory List LCD

Sr. NO	BNU fixed Asset Code / Serial	Model No	Location
1	UNI-10-9-38-48	Dell E-1709WC 17"	Lab 308
2	UNI-10-9-38-38	Dell E-1709WC 17"	Lab 308
3	UNI-10-9-38-46	Dell E-1709WC 17"	Lab 308
4	UNI-9-11-5-5	SAMSUNG 17”	Lab 308
5	UNI-10-9-38-42	Dell E-1709WC 17"	Lab 308
6	UNI-10-9-38-45	Dell E-1709WC 17"	Lab 308
7	UNI-10-9-38-43	Dell E-1709WC 17"	Lab 308
8	UNI-10-9-38-39	Dell E-1709WC 17"	Lab 308
9	UNI-10-9-38-27	Dell E-1709WC 17"	Lab 308
10	UNI-10-9-38-28	Dell E-1709WC 17"	Lab 308
11	UNI-12-12-9-27	ACER 17"	Lab 308
12	CN-OJ672H-64180-13N-OV6L	Dell E-1709WC 17"	Lab 308
13	CN-OU417N-64180-115-14US	Dell E-1709WC 17"	Lab 308
14	CN-OU417n-64180-O6C-1YTB	Dell E-1709WC 17"	Lab 308
15	CN-OU417N-64180-152-1F95	Dell E-1709WC 17"	Lab 308
16	CN-OJ672H-64180-12J-O8YL	Dell E-1709WC 17"	Lab 308

Annexure E

Faculty Resume

Name	**Shazia Rizwan**
Personal	**115/A2, Phase I** **PGECHS, LAHORE – 54770** **PHONE # 0345-4223437** **Email Address**: shazia_rizwan@bnu.edu.pk
Experience	**08/2005 – Present** **Head of Department (CS), Assistant Professor**, School of Computer & IT, Beaonhouse National University, Lahore **5/2001 – 08/2005** **Permanent Faculty Member**, Beaconhouse Informatics, Lahore. **6/1999 – 8/2000** **Visiting Faculty Member**, Beaconhouse Informatics, Lahore **5/1997 - 4/1998** **CONSULTANT**, German Foundation for Technical Cooperation, GTZ-Project with Directorate of Manpower and Training (DM&T), Staff Training Institute (STI), Punjab. Responsibilities included Designing and Implementation of M&E (Monitoring and Evaluation) System of Staff Training Institute and Training of the relevant staff through training seminars **9/1996 - 4/1997** **CONSULTANT**, German Foundation for Technical Cooperation, GTZ-Project with Directorate of Manpower and Training (DM&T), Apprenticeship Training Wing, Punjab. Responsibilities included training of selected DM&T staff in PC applications, and assistance to the German short term Advisor in development of the structure of the Management Information System for the Apprenticeship Wing, Punjab
Honors and Awards	• First Position in first two semesters in MS-Total Quality Management • Overall second position in MS-TQM • Academic Excellence Award, 1st

	position in MSCS-2004 at UCP, Lahore • Dean's List, Spring 2004 University of Central Punjab • Dean's List in Spring 1991 and Spring 1992 at Rutgers University, NJ, USA • Graduated with College Honors from Rutgers University
Memberships	Member Board of Studies, School of Computer & IT, BNU
Graduate Students Postdocs Undergraduate Students Honor Students	**2015- Present** External Evaluator of MS Thesis at IQTM, University of Punjab **2016 – Present** External Advisor, Punjab Public Service Commission, Lahore
Service Activity	N/A
Brief Statement of Research Interest	-
Publications	-

Name	**Syed Nouman Ali Shah**
Personal	**E-mail:** nouman.ali.syed@gmail.com **Cell #:** +92-321-9444734 **Address Home:** House # 7 Ahmad Street # 2 Chamman Park near Fateh Garh Grid Station, New Bridge Mughalpura Lahore15, and Punjab, Pakistan 54840.
Experience	**BEACONHOUSE NATIONAL UNIVERSITY, LAHORE PAKISTAN (AUGUST 2011 TILL TO DATE)** • Currently working as Assistant Professor in School of Computers & IT (SCIT) at Beaconhouse National University (BNU), Lahore Pakistan, from August 2011 till to date. • Teaching Domain Programming, Software Design, Web/Mobile Application Development, Object Oriented Programming, Data Structures. • Form IEEE-Branch at SCIT-BNU Lahore and supervise academic activities. • IEEE-Branch Counselor at BNU-SCIT Lahore. • Member of Departmental Academic Committee and Board of Studies. • Organize and Arrange In-House Software Competition in SCIT-BNU • Send teams to different Software competition • Supervised multiple undergraduate innovative final year projects. **VIRTUAL UNIVERSITY LAHORE PAKISTAN** • Recorded a under graduate level course "Introduction to Web Services" which is available online, I develop all the contents with study guide, handouts, assignments and exams. Course is launched on the official website of virtual university and open course work website of virtual university. • Involve in course development and roadmap development with Academic and Industrial linkage committee **GC UNIVERSITY LAHORE PAKISTAN (MAY 2007 TO MAY 2009)** • worked as Assistant Professor in Department of computer science GC University Lahore Pakistan for two year • Form IEEE-Branch at GCU Lahore and supervise academic activities. • IEEE-Branch Counselor at GCU Lahore. • Member of Departmental Academic & Administrative Committee. • Incharge of University Computer Equipment Maintenance Cell. • Win Project idea Competition PINNAKAL at KalSoft Karachi, stood 3rd among 54 universities in all over Pakistan. • Supervised 1Mphil research project and 3 undergraduate innovative final year projects. **BEACONHOUSE INFORMATICS (PVT) LTD (OCT 2001 TO JAN**

	2006) • Worked as permanent faculty member for 5 years. • Worked as coordinator of B.Sc. (Hons) Punjab university program • Worked as project coordinator of BBIT program in affiliation with Curtin University Australia • Taught Object Oriented Analysis, Design and programming, Data Structures & Algorithms Analysis & Design, Web programming and E-Commerce B2B Application development. **UNIVERSITY OF MANAGEMENT &TECHNOLOGY (UMT) LAHORE (AS VISITING FACULTY)** • Taught Corporate Information Systems to M.B.A class. • Through real industry case discussion in class, helped in developing analytical and problem solving skills of students. • Through extensive presentation and group discussion sessions, helped to develop presentation and group discussion skills. • Taught Data Structures in C++ to BBIT class from Sept 2009 to Jan 2010.
Honors and Awards	
Memberships	• IEEE-Member since 2008 • I have founded IEEE-Branch at Beaconhouse National University, Lahore and act as Branch Councilor in 2011- Till now. • I have founded IEEE-Branch at GCU, Lahore and act as Supervisor of Branch in 2008-2009 • I have founded IEEE-Branch at GCU, Lahore and act as Supervisor of Branch in 2011
Graduate Students	
Postdocs	

Undergraduate Students	**Years**	**Degree**	**Name**
Honor Students	2018	BSSE	Haroon Afzal, Awais Ullah, Salik Sameen)

Service Activity	• Appointed External examiner in Board of Technical Education Lahore. • Supervised multiple projects at Beaconhouse Informatics (Lahore). • External Supervisor of UET Lahore in B.Sc. (Hons) Computer Science and Engineering. • External Examiner of UET Lahore in M.Sc. Computer science in object oriented programming • External Examiner of UET Lahore in B.Sc. (Hons) Computer science in object oriented System analysis and Design. • External Examiner UET Lahore in B.Sc. (Hons) Computer science

	in Software Engineering. • External Examiner UET Lahore in B.Sc. (Hons) Computer science in Database Design and Modeling. • External Examiner Punjab University Lahore in M Phil. (Pharmacy) in Computer Programming. • Appointed Exam Manager from Head Office of Beaconhouse Informatics Pakistan in Sialkot Franchise branch of Informatics. Major responsibility is to maintain the international standard during exam prescribed by the Informatics Singapore and discipline.
Brief Statement of Research Interest	In this information era, where large amounts of information are available in electronic format, the problem becomes how to make relevant information accessible to the people that need it at the right time and in their native language. Computational Linguistics, with its more practical counterpart Natural Language Processing (NLP), is the interdisciplinary field that combines Linguistics and computational models of human language to study and facilitate communication between humans speaking different languages, and between humans and machines. For instance, NLP applications allow computers to follow spoken directions and answer questions in situations such as driving. Any computational model of verbal communication, first transforms speech into text (speech recognition), then analyzes the text into its underlying structure (syntactic parsing), and optionally assigns meaning to it (semantic interpretation). Then the reverse process takes place: the model generates all the relevant underlying structures from the meaning (syntactic generation) and decides which specific word form (or set of forms) conveys the meaning of each concept (morphological generation); the last step is to convert text into speech following some letter-to-sound rules (speech synthesis). My general research interests lie in the use and development of information retrieval and machine learning techniques for effective and efficient adaptive information access and mining. I am particularly interested in artificial intelligence and Machine Learning. My other areas of interest include personalized search and domain-dependent (e.g., business, medical) or task-specific (e.g, retail) information processing and knowledge discovery. When facing languages with limited resources, however, such a brute force approach to MT will not work. For the fast five years, I have explored on fast and inexpensive development of Rule-Based MT systems for such languages. The AVENUE project exploits available resources in resource rich languages, such as English, to transfer information to resource-poor languages, such as Urdu and Arabic. Although statistics has significantly advanced the field in MT through the use of pure statistical methods for languages with large amounts of parallel bilingual text, researchers have not yet achieved satisfactory results. Accuracy and fluency of MT output take a hit and reflect that no sensible linguistic knowledge is guiding the system. During my dissertation research, I focused on rule adaptation as guided by a predetermined set of heuristics. However, when the underlying translation system is not accessible, it would be interesting to try to automatically learn a finite state transducer or a synchronous grammar that given an incorrect (corrupted) translation produces a correct translation. This could be done using Machine Learning techniques to process the data extracted with the

	Translation Correction Tool, namely negative examples (incorrect MT output) paired up with positive examples (corrected translation).
Publications	• Monitoring node selection in wireless sensor networks based on fuzzy logic scheme System (Hammad Mushtaq 1,3, Syed Nouman Ali Shah 2, Naveed Ahmad Faraz 1) The 16th International Conference on Innovation and Management (ICIM 2019) • Wireless Sensor Networks Security using Hybrid Intrusion Detection System (Hammad Mushtaq1,2, Syed Nouman Ali3, Dr. Haroon Rasheed1,2) The 12th International Conference on Innovation and Management（ICIM2016） • Internet Markets & e-Advertising active models in Pakistan: Signifying e-Advertising artifacts apposite for e- Business startups (Hammad Mushtaq, Imran Sadiq, Syed Nouman Ali) at ICOBM 2012.

Name:	Dr. Natash Ali Mian
Personal:	0321-9464209 Natash.ali@bnu.edu.pk
Experience	Assistant Professor , SCIT, Beaconhouse National University January 2012 till Date Lecturer, Department of CS & IT, The University of Lahore February 2012 Visiting Faculty Member, Faculty of Information Technology, University of Central Punjab, Lahore Visiting faculty member from February 2007 to July 2009 Visiting Faculty Member, Federal Urdu University of Arts, Science and Technology, Islamabad Visiting faculty member from September 2004 to December 2006 Visiting Faculty Member, SZABIST Islamabad Campus, Islamabad Visiting faculty member from August 2004 to December 2005 Permanent Lecturer, Pakistan College of Science and Technology, Kasur Permanent Lecturer from August 2003 to August 2004 Permanent Faculty Member, Pakistan International College, Lahore Permanent faculty member from September 2001 to August 2003
Honors and Awards	
Memberships	Member, Council of DRR's

	Past President, Lahore Chapter, Pakistan Agile Development Society Past President and Member, Rotary Club of Lahore Executives
Graduate Students Postdocs Undergraduate Students Honor Students	MS Program Waseem Iqbal MS Program Arshad Abbas Multiple
Service Activity	Abdul Wali Khan University, Mardan External Evaluator of BS Final Year Projects and MS Thesis in 2014 University of Agriculture, Faisalabad External evaluator for MCS final projects in year 2007 Faculty of Information Technology, University of Central Punjab, Lahore External evaluator for final year projects of BS and MCS in 2008 & 2011 Department of Computer Science and Information Technology, The University of Lahore Supervised two (2) MS Thesis in 2012-2013 Lahore Garrison University Research Journal of Computer Science and information Technology (LGURJCSIT) Working as a Reviewer IEEE Access Working as a Reviewer European Alliance for Innovation (EAI) Transactions Working as a Reviewer
Brief Statement of Research Interest	
Publications	1. Muhammad Waseem Iqbal, Nadeem Ahmad, Syed Khuram Shahzad, Irum Feroz, **Natash A. Mian,** "Perception of Autonomous Vehicles:

Legal and Ethical Issues", International Journal of Advanced and Applied Science (IJAAS), 6 (5), 2019.

2. Muhammad Waseem Iqbal, Nadeem Ahmad, Syed Khuram Shahzad, Irum Feroz, **Natash A. Mian**, "Towards Adaptive user Interfaces for Mobile-Phone in Smart World" , International Journal of Advanced Computer Science and Applications(IJACSA), 9(11), 2018.

3. **Natash A. Mian** and Farooq Ahmad, "Agent based Architecture for Modeling and Analysis of Self Adaptive Systems using Formal Methods" International Journal of Advanced Computer Science and Applications(IJACSA), 9(1), 2018.

4. **Natash A. Mian,** and Farooq Ahmad. "Modeling and Analysis of MAPE-K loop in Self Adaptive Systems using Petri Nets." IJCSNS 17, no. 12 (2017)

5. Muhammad Imran Tariq, Shahzadi Tayyaba, Muhammad Usman Hashmi, Muhammad Waseem Ashraf, and **Natash A. Mian.** "Agent Based Information Security Threat Management Framework for Hybrid Cloud Computing." IJCSNS 17, no. 12 (2017): 57.

6. **Natash A. Mian,** Sher A. Khan and Nazir A. Zafar, "Database Reverse Engineering Methods: What is Missing?" *Research. Journal of Recent Sciences, no 2(5),* 2013

Journals (other)

7. Muhammad Ajmal Siddiqui, Muhammad Saleem Akhtar and **Natash A. Mian**, "A Comparative Analysis of Conventional Software Development Approaches Vs. Formal Methods in Call Distribution Systems, VAWKUM Transactions on Computer Sciences, no. 3 (2), 2014

8. Muhammad Waseem Iqbal, Misbah Noor and **Natash A. Mian**, "Analysis of Internet Addiction amongst University Level Students", VFAST Transactions on Software Engineering,

no. 3 (2), 2014.

9. Muhammad Farooq, Muhammad Waseem Iqbal, Toqir Ahmad Rana and **Natash A. Mian**, "Comparative Analysis of Fault-Tolerance Techniques for Space Applications, VFAST Transactions on Software Engineering, no. 3 (2), 2014.

10. Muhammad Ashraf and **Natash A. Mian,** Impact Agile Project Management": Identification and Analysis of problems in Scrum Implementation, VAWKUM Transactions on Computer Sciences, no. 2 (2), 2013.

11. Ghulam Yasin, Sabah Arif and **Natash A. Mian**, "Enhanced Cloud Computing Model Using Systematic Approach towards the Quality of Service in Cloud Computing", VFAST Transactions on Software Engineering, no. 2 (2), 2013.

Conferences
(All papers have been orally presented)
International

1. Waqar A. Khan, **Natash A. Mian**, Shahid Yousaf and Zubair Nawaz, "E-Commerce in Pakistan", 11th Conference on Frontiers of Information Technology (FIT 2013), Islamabad, Pakistan, 2013.

2. **Natash A. Mian** and Nazir A. Zafar, "Key Analysis of Normalization Process using Formal Techniques in DBRE", 2nd International Conference on Computer Engineering and Applications, Bali Island, Indonesia, March 2010.

3. **Natash A. Mian** and Nazir A. Zafar, "Modeling and Formal Specification of a Database Reverse Engineering Process Using Z Notation", 9th International Pure Mathematical Conference, Islamabad, Pakistan, August 2008.

4. **Natash A. Mian** and Tauqeer Hussain, "Database Reverse Engineering Tools", 7th WSEAS International Conference on Software Engineering, Parallel and Distributed Systems, University of Cambridge, Cambridge, UK, February 2008.

5. **Natash A. Mian** and Nazir A. Zafar, "Applications of Mathematical Techniques in Software Engineering", 7th International Pure Mathematical Conference, Islamabad, Pakistan, August 2006.

National

6. Fakhar Imran, Arooj A. Khan, Iqra Iqbal, Farhan Umer, Asim Irshad and **Natash A. Mian**, "Requirement Engineering Framework for Adaptation in Cloud Systems" 2nd National Conference on Computer Science and Information Technology (NCCSIT 2018), 2018

7. Arooj A. Khan and **Natash A. Mian** and "Systematic Analysis of Requirements Modelling techniques for Self-Adaptive Systems" 2nd National Conference on Computer Science and Information Technology (NCCSIT 2018), 2018.

8. **Natash A. Mian**, Syed Hasnain H. Shah, Nazir A. Zafar, "Formal Specification of Database Reverse Engineering Process Using Z Notation", Doctoral Symposium on Research in Computer Science, University of Central Punjab, Lahore, Pakistan. August 2008.

9. **Natash A. Mian** and Nazir A. Zafar, "Refinement of Railroad Crossing Problem using Formal Methods", 3rd CIIT Workshop on Research in Computing, COMSATS Wah Cant Campus, Wah Cant, Pakistan. April 2006.

10. **Natash A. Mian** and Nazir A. Zafar, "Formalizing Railroad Crossing Problem", 2nd CIIT Workshop on Research in Computing, COMSATS Lahore Campus, Lahore, Pakistan. November 2005.

Name	Huda Sarfraz
Personal	Phone No.: 0321-4513897
Experience	August 2012 to Present, Assistant Professor, Beaconhouse National University, Lahore. May 2010 to June 2012, Assistant Manager (Research), Al-Khawarizmi Institute of Computer Science, University of Engineering & Technology, Lahore. January 2008 to April 2010, Senior Development Engineer, Center for Research in Urdu Language Processing, National University of Computer & Emerging Science, Lahore. April 2005 to December 2007, Development Engineer, Center for Research in Urdu Language Processing, National University of Computer & Emerging Science, Lahore.
Honors and Awards	None.
Memberships	Mozilla Urdu Localization Maintainer. 2011 - 2015. Mozilla Reps Mentor. May 2014 – October 2015. Mozilla Rep. August 2013 – October 2015. Internationalized Domain Names (IDN) Variant Issues Project. Arabic case study team member. 2011.
Graduate Students Postdocs Undergraduate Students Honor Students	None.
Service Activity	Research and advocacy for humane management of stray animals and animal welfare.
Brief Statement of Research	Natural language processing, including speech

Interest	processing and machine translation, specifically for Urdu and local languages as well.
Publications	**Books** • S. Hussain, S. Shams and **H. Sarfraz**. ***Dareecha ICT Training Program for Public Schools in Rural Punjab***. Center for Language Engineering, Al-Khawarizmi Institute of Computer Science, University of Engineering & Technology, Lahore, Pakistan. 2012. http://www.panl10n.net/english/outputs/DareechaBook.pdf **Papers published in refereed conference proceedings** • **H.Sarfraz**, A. Dilawari and S. Hussain. ***Assesing Urdu Language Support on the Multilingual Web.*** In the Proceedings of the Conference on Human Language Technology for Development (HLTD 2011). Alexandria, Egypt. 2-5 May 2011. • **H. Sarfraz**, S. Hussain, M. Bano, A. Mustafa and R. Parveen. ***Urdu Localization of Open Source Software.*** In the Proceedings of the Fourth International Conference on Open Source Systems and Technologies (ICOSST 2010). Lahore, Pakistan. 22-24 December 2010. • **H. Sarfraz**, S. Hussain, R. Bokhari, A.A. Raza, I. Ullah, Z. Sarfraz, S. Pervez, A. Mustafa, I. Javed and R. Parveen. ***Large Vocabulary Continuous Speech Recognition for Urdu.*** In the Proceedings of International Conference on Frontiers of Information Technology (FIT) 2010. Islamabad, Pakistan. 21-23 December 2010. • **H. Sarfraz**, S. Hussain, R. Bokhari, A.A. Raza, I. Ullah, Z. Sarfraz, S. Pervez, A. Mustafa, I. Javed and R. Parveen. ***Speech Corpus Development for a Speaker Independent Spontaneous Urdu Speech Recognition System.*** In the Proceedings of Oriental COCOSDA (International

Committee for the Co-ordination and Standardization of Speech Databases and Assessment Techniques) 2010. Kathmandu, Nepal. 24-25 November 2010.

- A.A. Raza, S. Hussain, **H. Sarfraz**, I. Ullah and Z. Sarfraz. ***An ASR System for Spontaneous Urdu Speech.*** In the Proceedings of Oriental COCOSDA (International Committee for the Co-ordination and Standardization of Speech Databases and Assessment Techniques) 2010. Kathmandu, Nepal. 24-25 November 2010.
- A.A. Raza, S. Hussain, **H. Sarfraz**, I. Ullah and Z. Sarfraz. ***Design and Development of Phonetically Rich Urdu Speech Corpus***. In the Proceedings of Oriental COCOSDA (International Committee for the Co-ordination and Standardization of Speech Databases and Assessment Techniques) 2009. Urunqi, China. 10-13 August 2009.
- **H. Sarfraz** and T. Naseem. ***Sentence Segmentation and Segment Re-ordering for English to Urdu Machine Translation***. In the Proceedings of Conference on Language and Technology 2007. Bara Gali Summer Campus, University of Peshawar, Pakistan. 7-11 August 2007.
- N. Karamat, **H. Sarfraz**, S. Nawaz. ***OOReL (Object Oriented Recognition Lab)***. International Multi Topic Conference (INMIC). Karachi, Pakistan. 27-28 December. 2002.

Contribution to edited volumes.

- **H. Sarfraz**, S. Hussain. ***A Window of Opportunity.*** In Spider Magazine, Educational Supplement. March 2010.
- N. Karamat, S. Nawaz and **H. Sarfraz**. ***Unigram Analysis of Urdu Names for a Speech Recognition Application***. Akhbar-e-Urdu. National Language Authority, Islamabad, Pakistan. June 2003.
- **H. Sarfraz**. ***Formation of Generalization Words ("Mohmil") in Urdu***. Akhbar-e-Urdu. National Language Authority, Islamabad, Pakistan. April-May 2002.

Scholarly and/or creative activity published

	through a refereed electronic venue. • **H. Sarfraz**. ***Stepping Stone***. Digital story developed during the 2nd GEM Global Exchange, Digital Storytelling Workshop. Organized by the Association for Progressive Communications (APC). Bali, Indonesia. 24-30 November 2009. (http://vimeo.com/8028670)

Name:	**Iftikhar Hussain**
Personal:	**Address:** 111C Judicial Colony, Phase 1, Lahore, Pakistan **Mobile:** +92(0)3235356089 **Email:** iftikhar.iftikhar786@gmail.com -
Experience:	**Since 2017 BEACONHOUSE NATIONAL UNIVERSITY, LAHORE** Assistant Professor @ **School of Computer and IT** Performing responsibilities assigned by the academic Head. Taught Courses: Artificial Intelligence, software V&V, Data communication and computer networks, OOP…. **2013 – 2017 HASSELT UNIVERSITY, BELGIUM** PhD Researcher (Full time) Worked with academic members of the research institute in order to deliver project outcomes. Responsible for writing up research papers and presenting research findings to senior managers and also at academic meetings. Tools used: Java, Janus (Multi-agent platform), SARL (agent-oriented programming language), Spring MVC, JMP, FEATHERS (Activity-based model for Flanders, Belgium), GraphHopper (API & server), OSM dataset, QGIS, PostgreSQL, eclipse, Photoshop illustrator, MS Visio. **2010 – 2013 UNIVERSITY OF AZAD JAMMU & KASHMIR, MUZAFFARABAD** Lecturer CS & IT Description: Responsible for teaching undergraduate and graduate students in the department of Computer Science & Information Technology. Regularly have supervised the master thesis of graduate students and also the undergraduate research projects of final year students. Have lead several seminars in the CS & IT department. **2010 – 2010 SAVE THE CHILDREN, ERRP OFFICE ISLAMABAD** IT Assistant Description: Responsible for the installation, operation, and maintenance of computer systems and other technologies. Other responsibilities are: configuring hardware and software, setting up peripherals such as printers or routers, repairing equipment, and providing daily support for computer network users. **2010 – 2010 IBNE-SINA MODEL COLLEGE, KOTLI, AJK** Lecturer Description: Involved in teaching '*computer science' courses* to the intermediate level students.

	2009 – 2010	**EEZEESOFT SOL (SOFTWARE COMPANY)**
	Part time - Software Developer	Description: Responsible for designing, coding and modifying websites; from layout to function and according to a client's specifications.
	2008 – 2009	
	Full time - Software Developer	Tools used: PHP, MySQL & SQLServer, JQuery, JavaScript, CSS, HTML, Joomla, Dreamweaver, Photoshop etc.
Education:	**2013 - 2017**	**HASSELT UNIVERSITY, BELGIUM** PhD (Multi-agents in transportation) Thesis title: Agent-based Simulation Model and Matching Support Framework for Carpooling Supervisors: Prof. Dr. Davy Janssens; Prof. Dr. Tom Bellemans Mentor: Dr. Luk Knapen
	2008 - 2010	**IQRA UNIVERSITY, ISLAMABAD CAMPUS, PAKISTAN** MS(Computer Science) - Specialization in Software Engineering Credits/points: 33, Grade: B+, 3.73/4.0 (83%) Thesis title: New Approaches for Exact Pattern Matching Supervisor: Prof. Dr. Jamil Ahmad
	2003 - 2007	**UNIVERSITY OF AZAD JAMMU & KASHMIR, MUZAFFARABAD** BS(IT) hons. - Information Technology Credits/points: 134, Grade: B, 3.4/4.0 Final year project: Siraat-ul-Mustaqeem – Online Holy Qur'an and Islamic library management system Tools used: PHP, SQL Server, Dreamweaver
	2012 - 2013	**UNIVERSITY OF AZAD JAMMU & KASHMIR, MUZAFFARABAD** B.Ed. – Diploma in Education Grade: B, 1st Division (61%)
Honors and Awards:	**2013 – 2017**	**HIGHER EDUCATION COMMISSION, PAKISTAN** PhD studies Faculty Development Program – Batch III
	2014 - 2014	**HASSELT UNIVERSITY, BELGIUM** Short stay abroad – Doctoral School Visited: UTBM, Belfort, France Janus training and implement pilot carpooling simulation
Technical	**Journals**	IEEE Access (5)

Committee Member		Simulation (2) Journal of Ambient Intelligence and Humanized Computing (2) Applied Sciences (4) Sustainability (30) Energies (3) Societies (1) International Journal of Organization Theory & Behavior (1) International Journal of Environmental Research and Public Health (1) **Details:** https://publons.com/researcher/1468680/iftikhar-hussain/peer-review/
	Conferences	**CSAE 2019** The 3rd International Conference on Computer Science and Application Engineering October 22 to 24, 2019 in Sanya, China. **FNC 2019** The 14th International Conference on Future Networks and Communications August 19-21, 2019, Halifax, Canada **MOBISPC 2019** The 16th International Conference on Mobile Systems and Pervasive Computing August 19-21, 2019, Halifax, Canada **ANT 2018** The 9th International Conference on Ambient Systems, Networks and Technologies May 8-11, 2018, Porto, Portugal **ICTH 2017** The 7th International Conference on Current and Future Trends of Information and Communication Technologies in Healthcare September 18-20, 2017, Lund, Sweden
Supervision:	**Graduate Students**	**MUHAMMAD ARSALAN KHAN** Hasselt University, Belgium Activity-based models: Agent negotiation to cooperate for carpooling (Supervisor) **OWAIS AZEEM** Hasselt University, Belgium Conceptual Multi-Agent Based Negotiation Framework for Freight Transport Demand Simulation (Co-

	supervisor)
Conference Attended	**BIVEC/GIBET-2017** Proceedings of the BIVEC/GIBET Transport Research Days 2017 May 18-19, 2017, Liege, Belgium **URBAN TRANSPORT AND THE ENVIRONMENT** 21st International Conference on Urban Transport and the Environment. 2-5 June, 2015, Valencia, Spain **BIVEC/GIBET-2015** Proceedings of the BIVEC/GIBET Transport Research Days 2015 May 28-29, 2015, Eindhoven, Netherlands **ANT-2014** The 5th International Conference on Ambient Systems, Networks and Technologies June 2 - 5, 2014, Hasselt, Belgium **ICIET-2010** 2010 International Conference on Information and Emerging Technologies June 14 - 16, 2010, Karachi, Pakistan
Research Interest	Research interests: Organizational-based modeling; Multi-agents systems, Modeling interaction and negotiation; Machine learning, deep learning and matching algorithms; System modeling; modeling and simulation methodologies; modeling human behavior for real applications; data mining; computer vision and image processing; and open to try new ideas.
Journal Publications	**Published** Kaleem Arshid, Iftikhar Hussain, Shahid Hussain, & Misha Zahid, Primary User Traffic Pattern Based Opportunistic Spectrum Handoff in Cognitive Radio Networks, Sensors. (Thomson Reuters IF: 3.04) Samina Kausar, X. Huahu, Iftikhar Hussain, Z. Wenhao and Misha Zahid, "Integration of Data Mining Clustering Approach in the Personalized E-Learning System," **in IEEE Access**, vol. 6, pp. 72724-72734, **2018**. doi:10.1109/ACCESS.2018.2882240. (Thomson Reuters IF: 3.4) Iftikhar Hussain, Muhammad Arsalan Khan, Syed Fazal Abbas Baqueri, Seyyed Adnan Shah, Muhammad Khawar Bashir, Mudasser Muneer Khan & Israr Ali Khan, et *al.*, Organizational-based model and agent-based simulation for co-traveling at aggregate level, ***Applied Sciences-Basel (Special Issue: Multi-agent Systems)***, **2017**. (Thomson Reuters

		IF: 1.67) Iftikhar Hussain, Luk Knapen, Stéphane Galland, Ansar-Ul-Haque Yasar, Tom Bellemans, Davy Janssens & Geert Wets, Organizational-based model and agent-based simulation for long-term carpooling, ***Future Generation Computer Systems***, Volume 64, **2016**, Pages 125-139, ISSN 0167-739X. (Thomson Reuters IF: 3.99) Iftikhar Hussain, Luk Knapen, Ansar-Ul-Haque Yasar, Tom Bellemans, Davy Janssens & Geert Wets, Negotiation and Coordination in Carpooling: Agent-Based Simulation Model, ***Transportation Research Record****: Journal of the Transportation Research Board*, **2016**, Volume 2542:, pages 92-101, DOI: 10.3141/2542-11. (Thomson Reuters IF: 0.5) Iftikhar Hussain, Luk Knapen, Stephane Galland, Ansar-Ul-Haque Yasar, Tom Bellemans, Davy Janssens, Geert Wets, Agent-based Simulation Model for Long-term Carpooling: Effect of Activity Planning Constraints, ***Procedia Computer Science***, Volume 52, **2015**, Pages 412-419, ISSN 1877-0509. Iftikhar Hussain, Luk Knapen, Stephane Galland, Davy Janssens, Tom Bellemans, Ansar-Ul-Haque Yasar, Geert Wets, Organizational and Agent-based Automated Negotiation Model for Carpooling, ***Procedia Computer Science***, Volume 37, **2014**, Pages 396-403, ISSN 1877-0509. Iftikhar Hussain, Samina Kausar, Liaqat Hussain & Muhammad Asif Khan, Improved Approach for Exact Pattern Matching: Bidirectional Exact Pattern Matching, ***IJCSI International Journal of Computer Science Issues***, Vol. 10, Issue 3, No 1, May **2013**, ISSN (Print): 1694-0814 | ISSN (Online): 1694-0784. Iftikhar Hussain, Syed Zaki Hassan Kazmi, Israr Ali Khan and Rashid Mehmood, Improved-Bidirectional Exact Pattern Matching, ***International Journal of Scientific & Engineering Research***, Volume 4, Issue 5, May-**2013**, pages 659-663, ISSN 2229-5518.
Conference	**Published**	Iftikhar Hussain, Luk Knapen, Muhammad Arsalan

Publications	Khan, Tom Bellemans, Davy Janssens & Geert Wets, Agent-based Negotiation Model For Long-term Carpooling: A Flexible Mechanism For Trip Departure Times, *In the proceedings of the 21st International Conference on Urban Transport and the Environment*, Volume 146, 2015, Pages 461-473. Iftikhar Hussain, Luk Knapen, Tom Bellemans, Davy Janssens & Geert Wets, An Agent-based Negotiation Model for Carpooling: A Case Study for Flanders (Belgium). *In: The Transportation Research Board (TRB)*, 94th TRB Annual Meeting, 2015. Iftikhar Hussain, Luk Knapen, Bruno Kochan, Tom Bellemans, Davy Janssens & Geert Wets, *An Agent-based Model for Carpooling: Effect of Strict Timing Constraints on Carpooling Trips,* In: *BIVEC/GIBET Transport Research Days 2015*, 2015. Iftikhar Hussain, Luk Knapen, Tom Bellemans, Davy Janssens & Geert Wets, *Employees' Matching to Support Carpooling in Context of Large Companies,* I**n**: *BIVEC/GIBET Transport Research Days 2017*, 2017. Iftikhar Hussain, Imran Ali, Muhammad Zubair and Nazarat Bibi, Fastest approach to exact pattern matching, *2010 International Conference on Information and Emerging Technologies*, Karachi, 2010, pp. 1-5. doi: 10.1109/ICIET.2010.5625685. Iftikhar Hussain, Muhammad Zubair, Jamil Ahmed and Junaid Zaffar, Bidirectional exact pattern matching algorithm, *2010 International Conference on Modern Problems of Radio Engineering, Telecommunications and Computer Science (TCSET)*, Lviv-Slavske, 2010, pp. 293-293. Muhammad Zubair, Fazal Wahab, Iftikhar Hussain and Junaid Zaffar, Improved text scanning approach for exact String matching, *2010 International Conference on Information and Emerging Technologies*, Karachi, 2010, pp. 1-5, doi: 10.1109/ICIET.2010.5625719. Muhammad Zubair, Fazal Wahab, Iftikhar Hussain and Muhammad Ikram, Text scanning approach for exact string matching, *2010 International Conference on Networking and Information Technology*, Manila,

	2010, pp. 118-122, doi: 10.1109/ICNIT.2010.5508548.

Name	**Amna Humayun**
Personal	**Address**: 220-N, Model Town Extension, Lahore **Mobile #:** 0324-4789674 **Email:** amna.humayun@bnu.edu.pk
Experience	**9/2015 - Present** Assistant Professor Beaonhouse National University, Lahore **4/2013 - 8/2015** Assistant Professor The University of Lahore, Lahore **4/2011 - 3/2013** Assistant Professor Superior University **5/2010 - 11/2010** External Examiner Final Year Projects – Computer Science Forman Christian College, Lahore **8/2009 - 3/2010** Assistant Professor Forman Christian College, Lahore **8/2001 - 5/2009** Visiting Faculty NUCES-FAST, Lahore
Honors and Awards	• Reviewer, 8th IEEE International Multi-topic Conference, INMIC, 2004. • Judge, Ideas Extreme, 4th International and 13th National all Pakistan Software, Programming Competition, SOFTEC, NUCES-FAST, Lahore, 2008. • Judge, Ideas Extreme, 5th International and 14th National all Pakistan Software, Programming Competition, SOFTEC, NUCES-FAST, Lahore, 2009.

Memberships	Member Board of Studies, School of Computer & IT, BNU
Graduate Students Postdocs Undergraduate Students Honor Students	**5/2010 - 11/2010** External Examiner Final Year Projects ─ Computer Science Forman Christian College, Lahore
Service Activity	N/A
Brief Statement of Research Interest	Software engineering education and curriculum design, aspect oriented programming
Publications	Humayun, A., Basit, W., Farrukh, G. A., Lodhi, F., and Aden, R. 2010. An empirical analysis of team review approaches for teaching quality software development. In Proceedings of the 32nd ACM/IEEE international Conference on Software Engineering - Volume 1 (Cape Town, South Africa, May 01 - 08, 2010). ICSE '10. ACM, New York, NY, 567-575 ─ (rank 1 conference)

Name:	**Saad Saleem Malik**
Personal:	saadsaleemmalik@gmail.com 0336-4850065 27/A Al Firdous AVE. Faiz Road, Old Muslim Town Lahore 54600
Experience	Assistant Lecturer (BNU) 1st August 2013 – 31th December 2015 Lecturer (BNU) 1st January 2016 – Present
Honors and Awards	6th China Publishing Scholarship Classes 2018 Merit Scholarship – BNU
Memberships	Marketing Association of Pakistan (MAP)
Graduate Students Postdocs Undergraduate Students Honor Students	
Service Activity	Member Alumni Council 2013 Member Café Committee 2014
Brief Statement of Research Interest	Business Intelligence and E Commerce
Publications	N/A

Prof. Dr. Khaver Zia

Dean, School of Computer & IT, Beaconhouse National University
Tarogil, 13-Km Off Raiwind Road, Lahore. Pakistan
Cell: 0300-846 0983 E-mail: kzia@bnu.edu.pk

1. *Objective*

To contribute professionally in a University that provides a progressive environment for teaching, research and development.

2. *Qualifications*

Ph.D in Electronics Engineering. 1983.	University of Manchester, England. 1980-83. Thesis title: 'The control of multivariable systems with time delays'. Supervisor: Prof. D.J. Sandoz
M.Sc. in Electronics Engineering. 1980.	University of Manchester, England. 1979-80. Thesis title: 'Digital displacement transducers using pseudo-random binary sequences'. Supervisor: Prof. B.E. Jones
Post-graduate Diploma in Electronic Design Engineering. 1978.	Philips International Institute, Holland. 1978. One year academic program complemented with training in Philips Engg. Labs. Project: 'Design of a microcomputer system for process display'
B.Sc. in Electrical Engineering. 1976.	University of Engineering and Technology, Lahore. 1972-76. Specialization in Electronics and Communication Engineering.

3. *Research Interests*

1. Computer Education
2. Multilingual processing
3. Distance Learning (International Fellow of Open University, UK)

4. *Employment History*

1. Dean School of Computer and IT, Beaconhouse National University, Lahore.
   July 2005 to date.

2. Director of Academics and Dean, Beaconhouse-Informatics, Lahore.
   Feb 2000 to-June 2005.

3. Project Engineer (1983-89), Head of Academics (1990-96), Director, (1996-2000) at FAST Institute of Computer Science (now FAST National University), Lahore.

5. *Experience at Beaconhouse National University. (2005 to date)*

At Beaconhouse National University, the School of Computer and IT is conducting three Bachelor level programs; Management and Business Computing, Finance and Business computing and Software Engineering and a Master program in Business Computing. The School looked after (from 2005-2013), the University's IT Resource Centre which provides IT support and services to all the 7 schools of the University. As Dean of the School, my responsibilities, apart from teaching, are:

1. Academic management of the School of IT
   - Hiring of and liaising with faculty
   - Monitoring progress of academic programs
   - Planning and Budgeting
   - Attending to students' problems and issues
2. Development of the School of IT
   - Infrastructure development
   - Setting up new labs
   - Specifying equipment
3. Curriculum Development
   - Updating of Curriculum
   - Launching new programs and courses
4. IT Resource Centre (from 2005 to 2013)
   - Managing development of IT and network infrastructure at BNU new campus
   - Supervising IT Resource Centre Staff
   - Heading IT Procurement Committee

6. *Experience at Beaconhouse Informatics, Lahore (2000-05)*

At Beaconhouse-Informatics my job functions were:

1. Academic Management of Foreign and Local Degree Programs in Computer Science and Information Technology

   Providing academic support for all programs conducted under Beaconhouse-Informatics Pakistan. viz. Bachelor of Business (IT) in affiliation with Curtin University of Technology Australia, BSc(Hons) in Computing from Univ of Portsmouth, UK and BSc

(Hons) in Computer Science from University of the Punjab, Lahore.

2. Faculty development
   - Defining faculty ranks with qualifications and experience against each rank
   - Assigning ranks to existing faculty members
   - Faculty search and Hiring. Evaluating faculty profiles
   - Recommending faculty promotion
   - Defining faculty work load
   - Defining faculty streams of interest
   - Arranging faculty re-training and professional development

3. Implementing Academic Quality Plan
   - Devising processes and procedures to achieve quality.
   - Checking implementation of above processes.
   - Organizing Exam Revision and Analysis of Results
   - Monitoring Academic Counseling at Centers

4. Scholarships & Financial aid
   - Formulating scholarships and Financial Aid policy.
   - Recommending award of scholarships and Financial Aid.
   - Monitoring progress of recipients.

5. Library development
   - Acquisition of journals and magazines
   - Sharing information about library resources among Beaconhouse centers
   - Subscription to digital libraries

6. Working with Accreditation Bodies
   - Preparation of Feasibility Studies for Higher Education Commission
   - Organizing Inspection Visits
   - Liaising with Higher Education Commission Officials

7. *Experience at FAST Institute of Computer Science (now FAST National University), Lahore (1983-2000)*

I was founder-faculty responsible for initiating and managing the Bachelor's degree program in Computer Science at FAST-ICS, Lahore. This involved the following:

- Preparing feasibility of the project.
- Defining plan of studies, syllabi and courses of reading
- Preparing admission material including Prospectus.

- Preparation of Admission Test.
- Writing Software for computerized processing of admission test results.
- Selecting Teachers and Technical Personnel.
- Defining requirements of Institute's new campus
- Interacting with Architect and Contractor during construction of Institute's new campus.
- Overseeing the expansion of Institute's infrastructure and facilities from student enrollment of 35 (in 1990) to 600 (in 1999).
- Managing (as Director of the Institute from Sept 1996 to Jan 2000) the Institute's key departments of Administration, Accounts, Academic, Computer Labs, Library and Student Affairs.

8. *Experience of working with Accreditation bodies*

I was responsible for obtaining accreditation for Beaconhouse-Informatics for its Bachelor of Business (IT) degree program of Curtin University of Technology, Australia from the Higher Education Commission (HEC), Government of Pakistan. This entailed preparation of detailed Feasibility Report in accordance with HEC guidelines, organization of accreditation and inspection visits of HEC, technical correspondence, making presentations before HEC officials and taking academic and administrative measures to fulfill HEC requirements. As a culmination of the process which took over one year, all 4 campuses of Beaconhouse-Informatics were accredited; the first such multi-campus accreditation of a foreign degree program in Pakistan.

In addition to above, I have personally managed the following accreditation assignments:

1. Accreditation of Beaconhouse National University with NCEAC (HEC). Two visits Sept 2014 and Feb 2016. Feasibility Report Preparation; Visit; Presentation.
2. Accreditation of Beaconhouse-Informatics Lahore Campus by Government of the Punjab. (Feasibility Report Preparation; Visits; Presentations).
3. Accreditation by TEVTA (Technical Training and Vocational Training Authority) Govt of the Punjab.(Documentation; Visits; Presentations).
4. Affiliation of Bachelor program in Computer Science by University of the Punjab.(Affiliation documentation; Visits; Presentations).
5. Registration with Local Education Authority, Punjab. (Documentation, Visits)
6. Accreditation Processing for accreditation of Beaconhouse-Informatics with Northumbria University, Newcastle UK (Preparation of Quality Assurance Documentation).
7. Accreditation Processing for accreditation of Beaconhouse Informatics with NCC Education, UK (Preparation of Submission Document)

9. *Publications*

1. JONES & ZIA	Digital displacement transducers using PRBS and a microprocessor'; J. of Meas. and Control, UK, March 1981.
2. ZIA, K.	'Toward a microprocessor-based Nastaleeq composer'; 5th National Conference on Electronics, Islamabad, Oct. 1985.
3. ZIA.K	'Some Proposals for the Adaptation of Computer Hardware and Software for Urdu Language'; 30th Annual Convention of Inst. of Engineers Pakistan, Karachi. March 1988.'
4. ZIA, K.	"Multilingual Processing in Urdu" Proc.of Symposium on Multilingual Processing; Tsukuba , Japan, March 1996.
5. ZIA, K.	"Standard Code table for Urdu" Proceedings of 4th Multilingual Processing Symposium held in Yangon. Myanmar, October 1999.
6. ZIA, K.	"Survey of Standardization in Urdu" Proceedings of 4th Multilingual Processing Symposium held in Yangon. Myanmar, October 1999.
7. ZIA, K.	"Current Status of IT in Pakistan" Proceedings of 13th Asian Forum on Standardization of Information Technology, held in Yangon, Myanmar, October 1999.
8. ZIA, K.	"Unicode Standard for Urdu" Proceedings of Multilingual Processing Symposium held in Jahor Bahru, Malaysia, November 2000.
9. ZIA, K.	"Current Status of IT in Pakistan" Proceedings of 14th Asian Forum on Standardization of Information Technology, held in Jahor Bahru, Malaysia, November 2000.
10. ZIA, K.	"Mapping Urdu National Standard to Unicode" Proceedings of 22nd International Unicode Conference (IUC22), San Jose, California USA. September 2002.

11. ZIA. K & REZA S. "Representation of Balochi, Punjabi, Pushto, Sindhi Characters in Unicode". Proceedings of 23rd International Unicode Conference (IUC23), Prague, March 2003.

10. Professional Affiliations

1. Chair, IEEE, Lahore Section (2012)
2. Member, ACM, USA.
3. Member IEEE USA
4. Member, Pakistan Engineering Council.

11. Honours and Awards

1. Awarded International Fellowship of Open University UK. 2007
2. IEE Board of Publications Award, 1995
3. University of Manchester Postgraduate Award. 1980,'81,'82
4. Philips International Open Scholarship. 1976
5. Saigol Foundation Merit Scholarship. 1976
6. National Talent Scholarship. 1971 to 1975
7. National Talent Gold Medal for first position in pre-engg. exam. of Lahore Board of Education. 1972
8. Abid Hussain Gold Medal for first position in F.Sc.at Aitchison College, Lahore. 1971
9. Dane Bhima Gold Medal for first position in Mathematics and Science in School Certificate, Aitchison College. 1969
10. Albel Singh Watson Gold Medal for first position in History in School Certificate, Aitchison College. 1969
11. Godley Medal for first position in English Literature in School Certificate, Aitchison College. 1969

12. Computer Skills

1. Possess experience of Database Design using Oracle RDBMS and Developer 2000.
2. Possess a varied experience in the design and development of micro-processor based systems with special interest in software design.
3. Have acquired a good deal of Data Processing experience through development and implementation of fairly complex customized database applications.
4. Possess more than 10 years experience in the use of the personal computer for different design and development tasks.
5. Have designed systems around the following microprocessors: 8080, Z80, 8088/8086
6. Possess good working knowledge of following programming languages: Assembler, BASIC, Fortran, dBASE III Plus, C, C++

13. *Teaching and R & D Experience*

January 2004 to date.

During this period I taught the following courses to Bachelor of Computer Science and Bachelor of Computer Systems Classes at Beaconhouse Informatics and Beaconhouse National University, respectively.

Management of IT, ERP systems, Computer Networks, Object Oriented Programming in Java, Data Communications, Basic Electrical Engineering, Electrical Circuits, Electronic Circuits, Data Structures, Supervision of over 100 student projects.

January 1990 to March 1995.

During this period I taught the following courses (some multiple times) to Bachelor of Computer Science Class, at FAST Institute of Computer Science, Lahore.

Data Communications, Databases and Information Retrieval, Introduction to Programming, Programming-II, Electronic Devices & Circuits, Electricity & Electronics

Besides, I was working as Head of Academics, a position that involves curriculum development, and management of academic affairs, including admission to BCS program.

April 1989 to December 1989.

Team member in initiating and launching Bachelor's degree program in Computer Science at FAST, Lahore. This involved working out detailed instructional and financial feasibility of the project. I was responsible for working out syllabi and courses of reading, preparation of admission tests, and various admission documentation. I also independently developed a computer package (in dBASE III+) for handling student admissions, grading answer sheets, and preparation of merit lists.

February 1989 to March 1989.

Team member in development of a variety of database management programs to cater for the computerization requirements of a commercial bank. I was responsible for development of three such programs namely L/C Import Statements, Acceptances Outstanding and Payments Outstanding (P.A.D.). These software systems allow on-line posting, editing and printing of requisite information in the desired format. The installation of these systems has greatly facilitated the tasks of the L/C and Loans departments of the Lahore branch of the bank.

September 1988 to January 1989.

Team lead in the development of a complex database application project. The objective was to computerize the Rules of Procedure (ROP) of the Provincial Legislative Assembly. This was successfully realized and the computer system developed facilitates online retrieval of ROPs through a indexed system of keywords. It also facilitates subject-wise retrieval of entries. I was responsible for the planning, database design, and software development of this project.

March 1988 to June 1988.

Team member in the development of software to computerize the piece-work accounting operations of a Textile Mill. The software, developed for a personal computer, has been successfully commissioned at the Mill.

April 1987 to February 1988.

Team member in the design and development of Analog PABX, a major project of FAST. My contribution in this project was in all of the different phases of the project i.e. planning, conceptual design, detailed hardware and software design, implementation and documentation. More specifically, I contributed in working out the software design down to the flow diagram level, and designed the Trunk Interface card. I supervised the construction and testing of processor, trunk and subscriber cards using advanced tools such as Logic Analyzer and In-Circuit Emulator. Finally, I prepared schematics of the system hardware using a Schematic Capture package.

January 1987 to March 1987.

Team member in the development of Check Information Display System. The system, which was designed for a commercial bank, is used to display information to customers about clearing of their checks. This was a software project and I was involved in all the phases of software development.

March 1986 to December 1986.

Team member in the development of Flight Information Display System, a major project of FAST. Was responsible for development of software and hardware interfaces for LED units. Was also responsible for checking of final project documentation. During this period I was also associated in the preparation of a feasibility report for Advanced Diploma Program in Computer Science.

November 1983 to February 1986.

Team lead in the development of the Urdu Nastaleeq composer, a major project of FAST. Supervised the development of the composer from concept to laboratory model. An important module of the project involved study of Urdu linguistics and implementation of algorithms for the joining of *Naskh* characters to realize an Urdu text editor. Other modules related to a scheme for the digitization of ligatures, development of a *Naskh*-to-*Nastaleeq* post-processor and formatter, and a program for printing of edited output on a dot-matrix printer.

January 1980 to May 1983.

As a Ph. D. student at the University of Manchester, I worked on the development of algorithms used in the computer-aided design of control systems. I developed four algorithms for the control of time delays in process control systems. The algorithms were tested and evaluated using computer simulations of a multivariable control system.

January 1979 to December 1979.

As an M.Sc. student at the University of Manchester, I worked on the development of a digital displacement transducer using pseudo-random binary sequences. Microprocessor based and hard wired versions of the transducer were developed.

14. *Personal*

Date of Birth	26-Nov-1953
Marital status	Married, 3 children
Interests	History and Literature