PIR MEHR ALI SHAH
ARID AGRICULTURE UNIVERSITY RAWALPINDI

SELF-ASSESSMENT REPORT (2013-2015)
PhD Remote Sensing & GIS

Department of Geo-Informatics
Faculty of Agricultural Engineering & Technology

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Mr. Muhammad Amin (Member)

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INTRODUCTION

Geo-Informatics is the science of measuring, storing, organizing, analyzing, and visualizing data related to phenomena occurring on or near the earth's surface. Geo-informatics is, therefore, inherently interdisciplinary and includes concepts from measurement technologies (e.g. remote sensing), geographic information science, statistics, dynamic modeling and simulation, and computer science. Geographic location, with its associated attributes and processes, tie these domains together in the context of geo informatics. Geographical Information System (GIS) and Remote Sensing (RS) due to their advantage of analyzing and processing geo-referenced data have huge potential for efficient and sustainable management of natural resources like land, water and forests etc.

Owing to immense importance of geo-spatial technologies like GIS and RS in the development of Pakistan, the department of Geo-Informatics was established by the worthy chancellor, Prof. Dr. Rai Niaz Ahmed in 2013. Initially, postgraduate programs i.e MS and PhD RS & GIS were started. These programs are research oriented and focus on real world problems faced by national and international community.

PhD RS & GIS program of the department is an independent research based three year program which accepts professionals with various backgrounds and specializations who want to excel in their fields by the use of RS & GIS as tools. With the human-land relationship as the theme, with catering for global change research and regional sustainable development as the objective, this PhD program integrates satellite application, remote sensing, geographic information system, computer-aided design and cartography, multi-media and virtual reality

techniques and the internet to establish a scientific structure for high-speed information digitization and effective resource management.

In view of the above-mentioned facts, the present programme is designed to provide a solid conceptual framework and technical know-how for practicing professionals and officials by enhancing their skills and equipping their hands-on experience. It also introduces the state-of-the-art geo-spatial information technologies and provides students with the capability to apply the latest technologies to solve real world problems.

A well oriented scheme of studies has been implemented as recommended by HEC under revised syllabus of Geo informatics for post graduate degree programs. The courses include core remote sensing, GIS, Geo-Database, computer science, agriculture and climate change aspects.

The department has most modern facility for creation, processing and modeling of digital geospatial data, which caters to the multifarious needs of students, users, researchers and various projects of the institute. Technology development in the areas of GIS, database management, spatial analysis and modeling, development of decision support/expert systems is its main focus.

PhD research scholars at the department are currently involved in the research like development of National Spatial Data Infrastructure (NSDI) for better formulation of agricultural policies, improved earth observation for better crop management, sustainable development in agriculture, groundwater modeling and terrorism risk mapping, carbon sequestration, wildfire risk assessment.

This self-assessment report aims to highlight the strengths and weaknesses of the department. The report is prepared on the basis of eight criteria devised by HEC quality assurance team. This document highlights the salient features of PhD program of RS & GIS.

1. CRITERION 1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

The self-assessment is based on a number of criteria through establishment of various standards. This section describes how the standards of the criterion 1 are met.

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

MISSION STATEMENT

The mission of doctoral program in Remote Sensing & Geographic Information Science is to nurture creative scholars who have the capacity of independently carrying out advance research in the fields of geo-spatial technologies using enhanced theoretical and practical knowledge. Specifically, program graduates will be able to:

- Exhibit the underlying knowledge of principles and practices of the geospatial sciences.
- Master the advanced methodologies and/or quantitative analyses used in at least one of three geospatial specialization areas: (a) spatial data mining and management, (b) advanced spatial analysis and modeling, or (c) advanced remote sensing and satellite technologies.
- Produce innovative research that advances theory or methodology in the geospatial sciences and publish the research in conferences and peer-reviewed journals.

PROGRAMME OBJECTIVES

Our PhD in Remote Sensing & GIS program has following distinguishing objectives:

1. To enhance the capacity of the professionals and researchers in the fields of GIS & RS.
2. To produce individuals who are capable of introducing new horizons to the subject and conducting independent researches and projects.
3. To apply geo-spatial technologies for solving real world problems and develop all important geo-referenced information and spatial data products for efficient management of resources.

Table 1: Assessment of program objectives

Sr. No	Objective	How measured	When measured	Improvements Identified	Improvements Made
1.	Capacity building	Quizzes, assignments, projects, and exams.	Quiz & assignments are taken during the whole semester. Midterm exams and final exams along with semester projects are taken in the mid and end of semester respectively.	Faculty to student ratio is high.	Faculty is inducted and more will be hired.
2.	Producing individuals who can undertake independent and high quality research.	PhD Thesis, Comprehensive Exams, papers published and presented in conferences.	Course work in first two semesters. Synopsis defense in 2nd semester. Thesis defense at the end of degree. Publishing of paper during the study period or at the end.	Industrial funded research projects are required.	Creative and attractive projects are recommended and appreciated.
3.	Application of geo-spatial technologie.	PhD Thesis and semester projects.	Synopsis defense, research progress review and final defense.	Some application areas are not explored yet.	Awareness is being created and students are being motivated to research on country needs.

Standard 1.2: The program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and that graduating students are capable of performing these outcome.

PROGRAM LEARNING OUTCOMES:

1. Knowledge and Understanding

The program ambition is to develop the necessary skills of the students to effectively use spatial information for solving practical problems and giving alternate solutions using RS & GIS. The program aims to develop student abilities to undertake individual and high quality research.

On successful completion of program, the students will be able to:

I. Understand the usefulness of the spatial data in solving real world problems;

II. Show their appreciation of the requirements of a variety of different user disciplines and enable the optimal use of GIS/RS technology; and

III. Propose, plan, manage and report on project work, both as individuals and as members of a team.

2. Intellectual skills:

The program also has the ambition to develop strong intellectual skills among the graduates and require the students to.

I. Make informed and critical judgments when faced with an issue concerning geographic information management;

II. Analyze, synthesis and summarize the spatial data and spatial analysis requirements of a remote sensing and/or GIS project;

III. Recognize the moral and ethical, as well as scientific issues that relate to geographic information and address these issues in context with current spatial data policies and strategies.

IV. be able to design, develop and evaluate methodologies and develop critics of them, and where appropriate, propose new techniques for research.

3. Subject Practical skills:

The program specification requires students to:

I. have gained a practical knowledge of the range of techniques and strategies related to geographic information management;

II. be able to understand the complexity of spatial data and their relationships with non-spatial information;

III. be able to perform spatial analysis on a varied range of spatial data;

IV. have gained complete understanding of spatial data acquisition procedures;

V. be able to quantitatively assess the quality of acquired spatial data;

4. Transferable/ key skills:

The PhD RS & GIS program requires students to demonstrate an understanding and knowledge in the following transferable and key skill areas:

I. Communication skills

II. Interpersonal and teamwork skills

III. Numeracy and IT skills

IV. Self-management and professional development skills

Table 2: Program Objectives versus Program Outcomes

PROGRAM OUTCOMES	PROGRAM OBJECTIVES		
	Capacity Building	**Producing individuals who can undertake independent and high quality research.**	**Application of geo-spatial technologies**
Knowledge and Understanding	✓	✓	
Intellectual Skills	✓	✓	✓
Subject Practical Skills	✓	✓	✓
Transferrable/Key Skills		✓	✓

Learning and Teaching/Knowledge and Understanding

Highly qualified professionals provide excellent technical and conceptual guidance to the students to produce highly organized and motivated individuals. Seminars and workshops are organized to invite external speakers to provide additional lectures. The courses taught to MS scholars are in accordance with the international education standards. The program uses a variety of teaching and learning approaches with a strong emphasis on student centered learning including: lectures, classroom based and computer lab based practical exercises, field based learning, seminars, tutorials, workshops, extra-curricular activities, guided independent study and the independent research project. Teaching and learning strategies are linked to the learning outcomes of the respective courses and individual sessions.

Learning and Teaching/Intellectual Skills

Intellectual skills are introduced, developed and tested in the formal taught sessions. Courses such as Introduction to GIS expose students to current geographic information policies and management strategies, testing their awareness of such using evaluative essays. Courses in Applied GIS and Remote Sensing provide students with the opportunity to reflect on the

interrelationship of knowledge between academic work and real world projects; and offer students exposure to research methodologies and their application in remote sensing and GIS. The final Research Project is regarded as the culmination of the development of intellectual skills at doctoral level.

Learning and Teaching/Subject Practical Skills

This program contains a balance of theoretical and practical skills appropriate for GIS and RS managers. Practical skills are included in majority of core courses with the emphasis on the application of subject knowledge, methods, techniques, and approaches to real world situations.

Learning and Teaching/Transferrable/Key Skills

As indicated above a variety of teaching and learning strategies are used, which are designed to facilitate the development of postgraduate level communication, numeracy, IT, interpersonal and self-management and development skills. The introduction, development and testing of generic postgraduate key skills is embedded in the program teaching and learning strategy.

Assessment Methods/Knowledge and Understanding

The assessment methods for each course are detailed in the course specifications. Assessments are designed to test the learning outcomes of the course. Students are informed of the assessment requirements in the program handbook and in the first lecture of each course. A wide variety of assessments are used, the emphasis is on assessments related to real world situations and approaches, and these include technical reports, critical and evaluative essays, journal papers, poster presentations, field notebooks and research proposals, semester and final projects. Courses such as Introduction to GIS, Introduction to Remote Sensing, Advanced RS and Digital Image Processing and Advanced GIS & Spatial Analysis, use a combination of theory examinations, practical examinations.

Assessment Methods/Intellectual Skills

Assessments are designed to test students' master's level intellectual skills, with a strong emphasis on demonstrating intellectual and critical understanding as well as subject knowledge. The assessments include critical and evaluative essays, journal papers, project proposals and project reports and final thesis.

Assessment Methods/Subject Practical Skills

Most assessments test some subject practical skills, depending on the learning outcomes. Assessments include spatial database design, GIS software customization, multi criteria evaluation projects, image analysis project, ground validation and site surveys.

Assessment Methods/Transferrable/Key Skills

A variety of assessment strategies are used across the program, including the following:

Communication skills

- Journal paper, essays, posters and other text based reviews.
- Oral presentations
- A mixture of technical and non-technical reports.

Interpersonal and teamwork skills

- group based fieldwork
- group based mini research project
- group presentations

Numeracy and IT skills

- Collection and analysis of spatial and non-spatial data
- Use of a varied range of GIS and Remote Sensing software
- Reports including geo-statistics
- Database management, design and implementation
- Programming and software customization

Self-management and professional development skills

- Interaction and discussion with industry experts
- The final research project is particularly important in the development of professional management skills.

RESEARCH AREA AND PROGRAMMES:

PhD level research at the Department of Geo-informatics, PMAS-AAUR is particularly carried out in compliance with the global challenges and to meet the international educational criteria and capacity development in the field of Geo-Informatics. Therefore the research areas need to be relevant to the national as well as regional challenges. Research areas aim at advancing the knowledge domains of spatial information and remote sensing technologies and methodologies. Besides that research topics are related to water resource management, food security, agricultural developments, green revolution and various other applications of remote sensing and GIS. Given its aim, the Department of Geo-Informatics carries out researches that can relate with the local and regional demands. Scientific excellence of the department is not only measured by highly cited journal publications, but also by the strong relevance with the needs of time.

Program Assessment Results

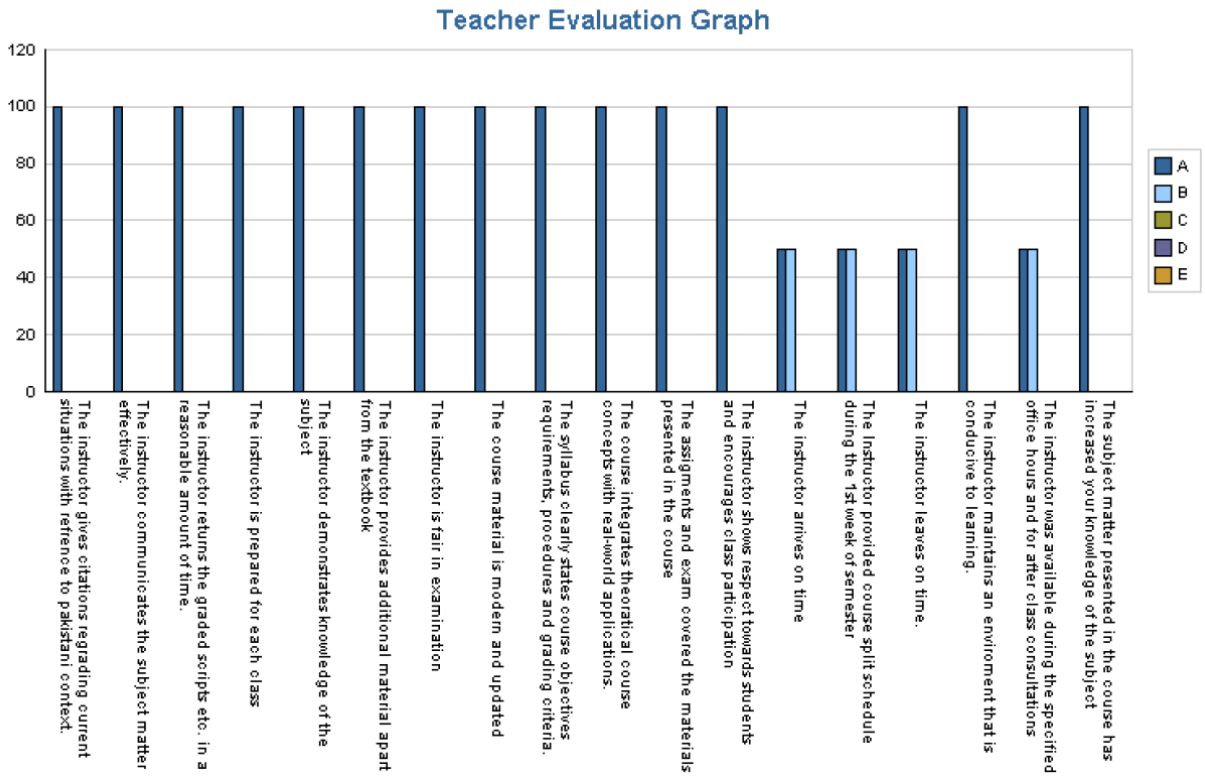
Teachers' evaluation

There were three teachers in the department who were teaching and supervising Ph.D. students in addition to visiting faculty members:

1. Dr. Mobushir Riaz Khan, Associate Professor/Chairman
2. Dr. Siddiqullah Baig, Assistant Professor
3. Dr. Naveed Tahir, Assistant Professor
4. Mr. Muhammad Amin, Lecturer (Involved in teaching deficiency courses)
5. Mr. Saif ur Rehman Khalid, Visiting Faculty (Involved in teaching deficiency courses)

All the teachers and courses were evaluated by the students at the end of the semester in accordance with proforma 10 & 1 devised by HEC. The graphical representation of evaluations done by students is given below. Students were asked to give opinion on the various indicators relating to instructor's performance and course delivery i.e. whether they strongly agree, agree, uncertain, disagree or strongly disagree. Feedback from the overwhelming majority was positive. Only very few were uncertain about few indicators. None of the response was negative.

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor gives citations regarding current situations with reference to Pakistani context”, “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor communicates the subject matter effectively” and “The instructor demonstrates knowledge of the subject”. 50 percent of the students strongly agreed that “ the instructor arrived and leaved on time in classes” and “The instructor was available during the specified office hours”.



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

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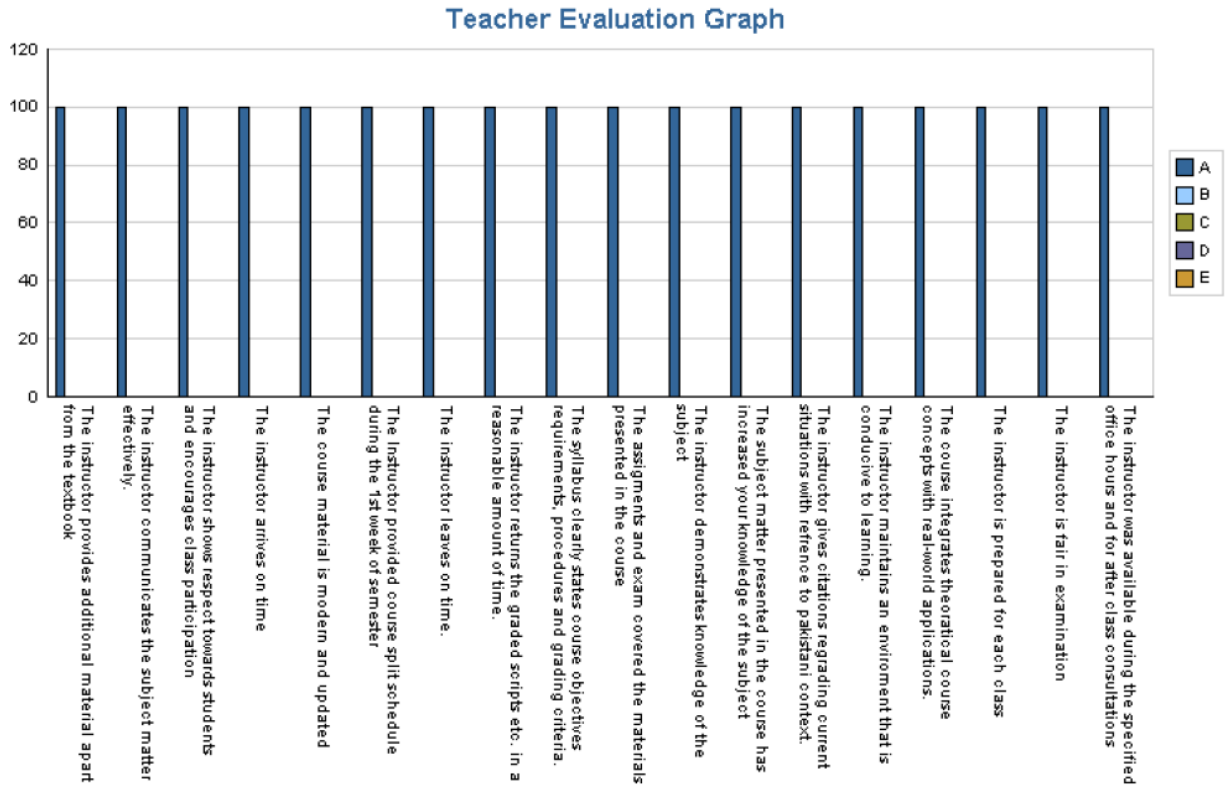

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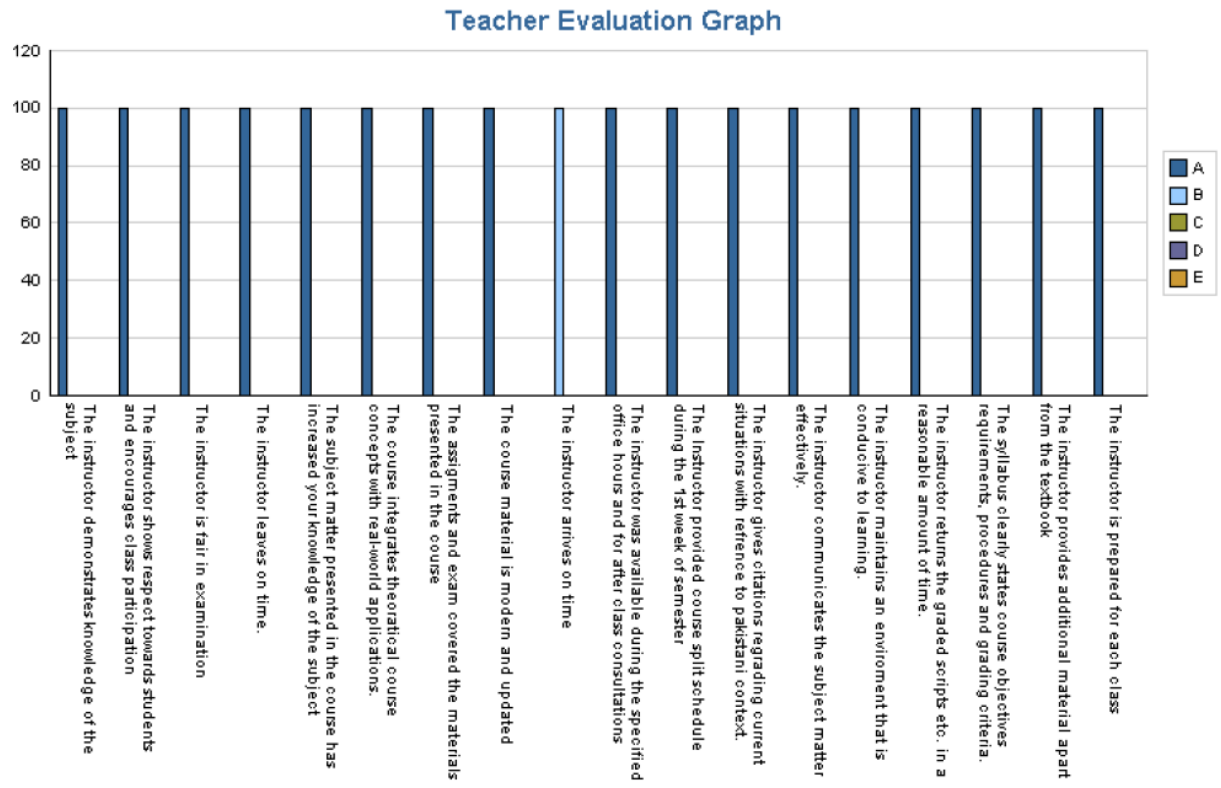
Mr. Muhammad Amin (RSG-703, Fall 2013-14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor gives citations regarding current situations with reference to Pakistani context”, “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor communicates the subject matter effectively” and “The instructor demonstrates knowledge of the subject”. 90 percent of the students strongly agreed that “ the instructor arrived on time in classes”.



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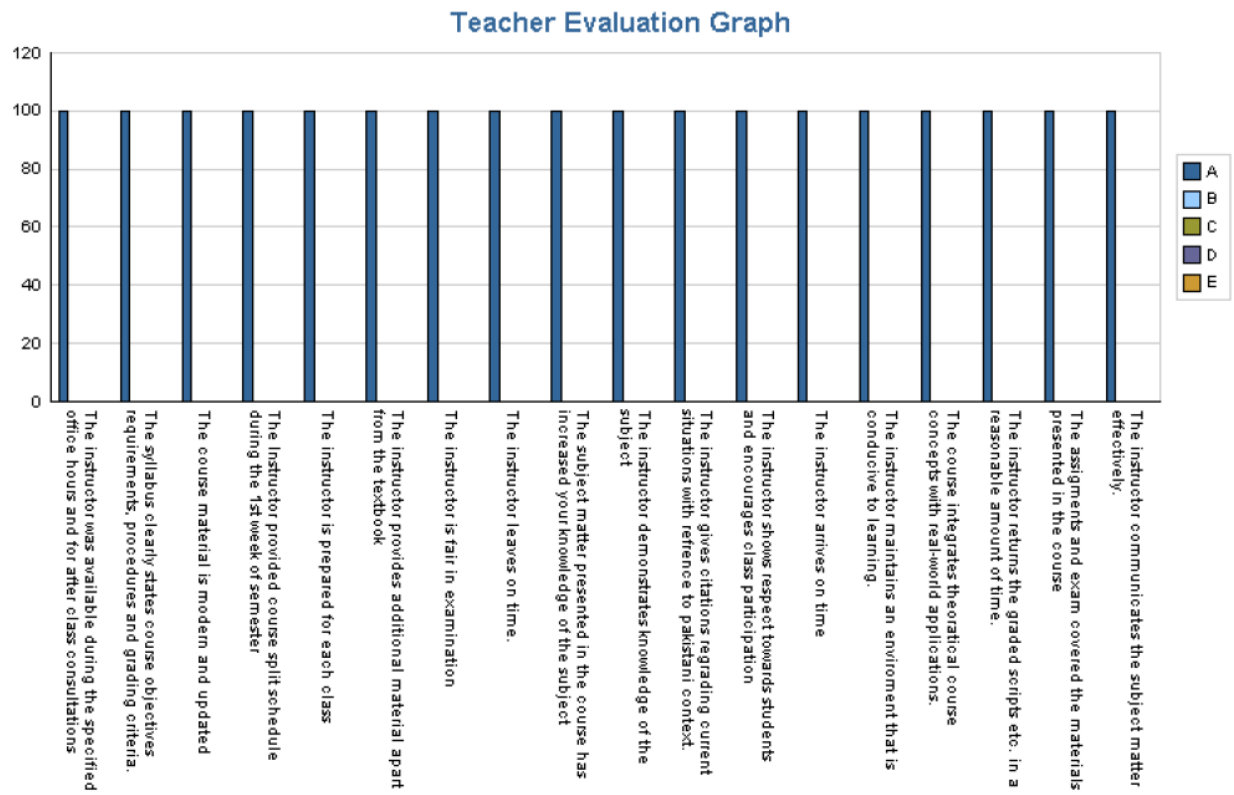

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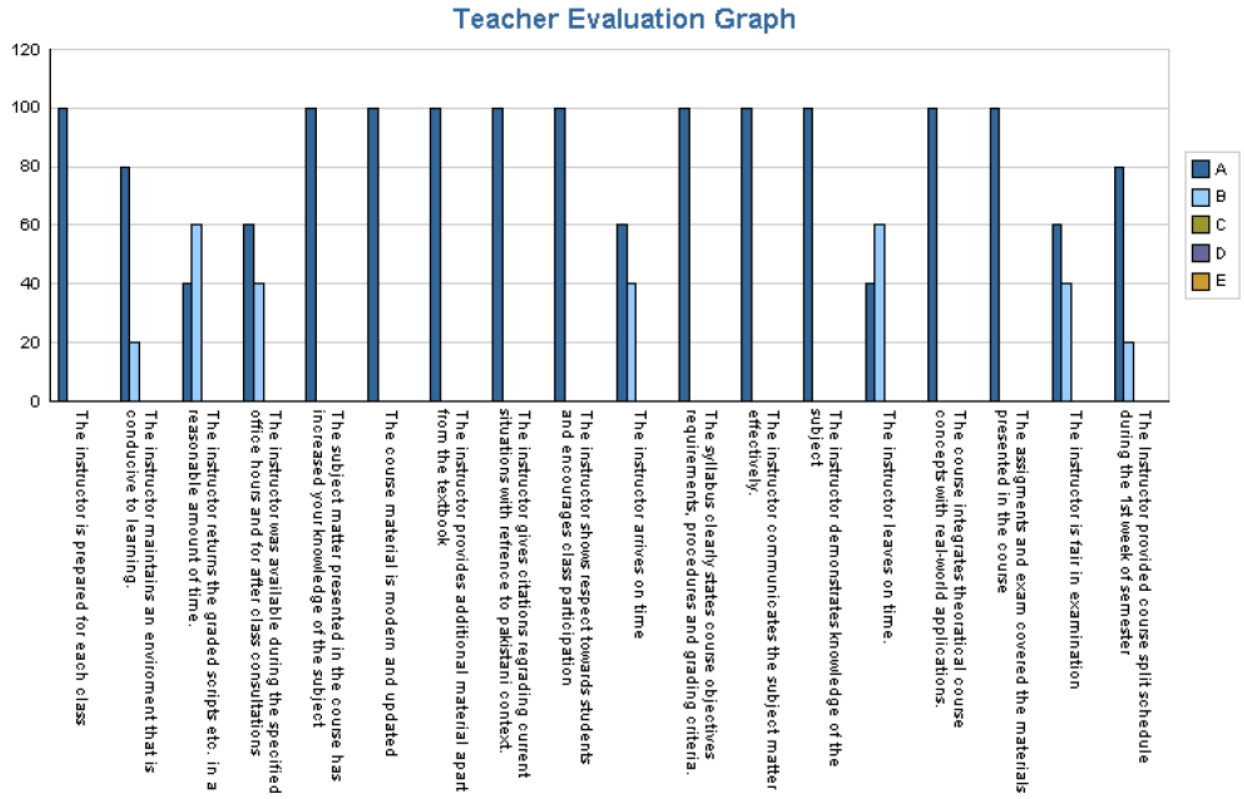
Dr. Mobushir Riaz Khan (RSG-705, Spring 14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor returned the graded scripts in reasonable time”, “The instructor communicates the subject matter effectively” and “The instructor demonstrates knowledge of the subject”. 80 percent of the students agreed that that “the instructor maintain conducive environment for learning” and “the instructor provided the course split schedule”. 60 percent students agreed “ the instructor arrived on time in classes”, “The instructor is fair in examinations” and “the instructor was available during specified hours”.



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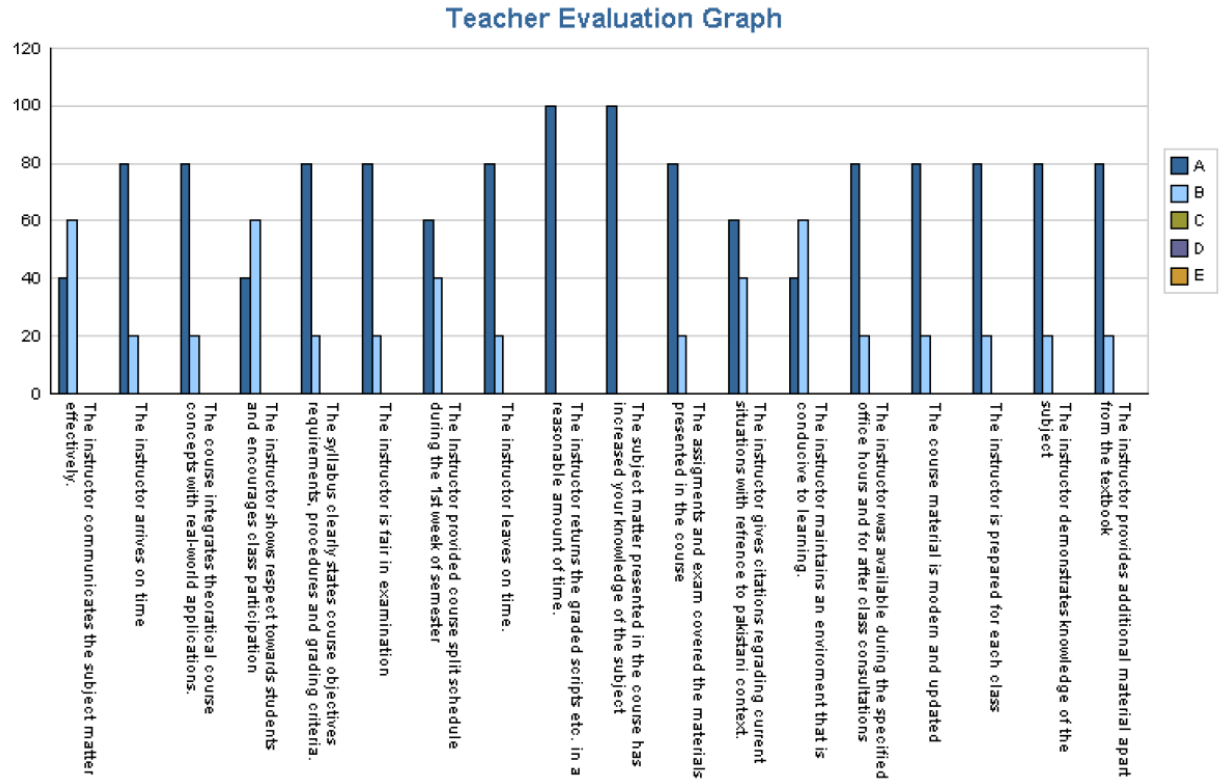
Dr. Siddiqulla Baig (RSG-706, Spring 14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that "The instructor returned the graded scripts in reasonable time" and "The course has increased my knowledge of the subject". 80 percent of the students agreed that "the instructor provides additional material apart from textbook", "The course integrates theoratical course concepts with real-world applications", "the instructor was available during specified hours", "The instructor communicates the subject matter effectively" and "The instructor demonstrates knowledge of the subject", 60 percent students strongly agreed " the instructor arrived on time in classes", "The instructor is fair in examinations" "the instructor maintain conducive environment for learning" and "the instructor provided the course split schedule".



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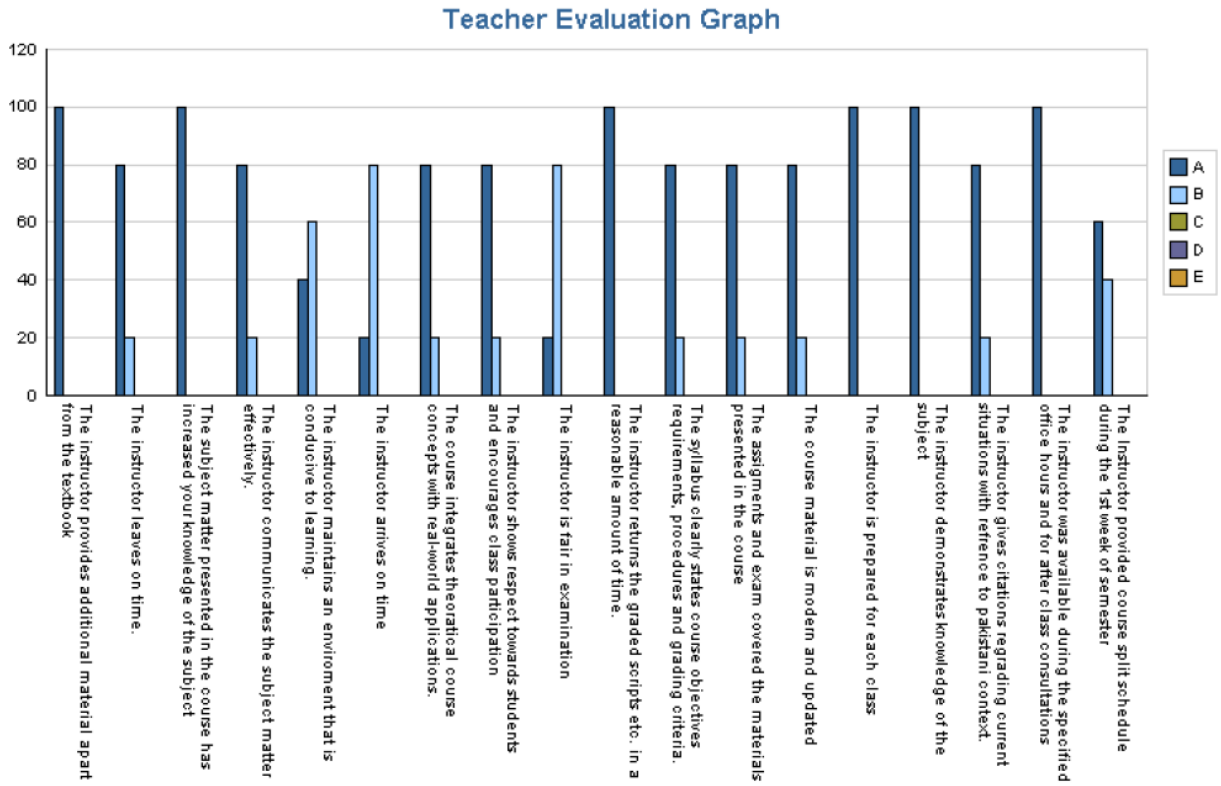
Dr. Mobushir Riaz Khan (RSG-717, Spring 14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor gives citations regarding current situations with reference to Pakistani context”, “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor was available during the specified office hours”, “The instructor returned the graded scripts in reasonable time”, “The instructor communicates the subject matter effectively” and “The instructor demonstrates knowledge of the subject”. 80 percent of the students agreed that “ the instructor arrived on time in classes” and “The instructor is fair in examinations”. 60 percent students agreed that “the instructor maintain conducive environment for learning”.



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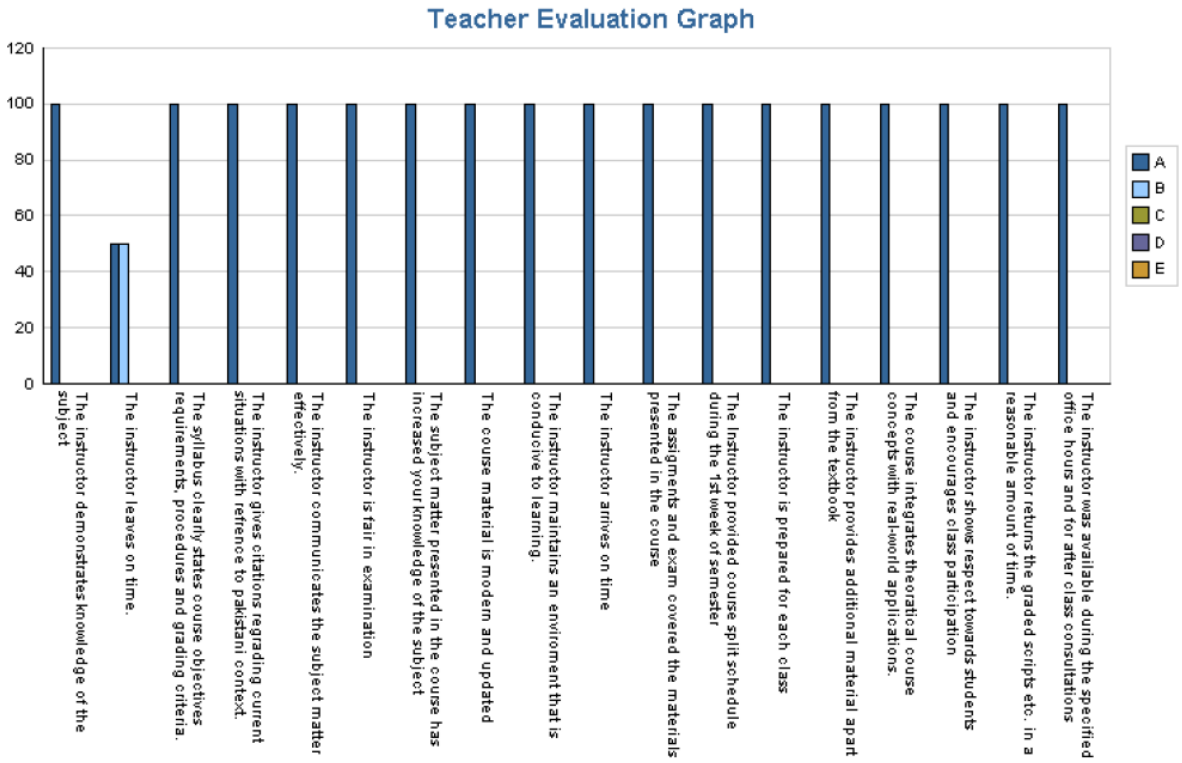
Mr. Saif ur Rehman Khalid (RSG-701, Fall 14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor was available during the specified office hours”, “The instructor returned the graded scripts in reasonable time”, “The instructor communicates the subject matter effectively”, “The instructor demonstrates knowledge of the subject”, “the instructor maintain conducive environment for learning”, “ the instructor arrived on time in classes” and “The instructor is fair in examinations”. 50% students strongly agreed that “the instructor leave on time in classess”.



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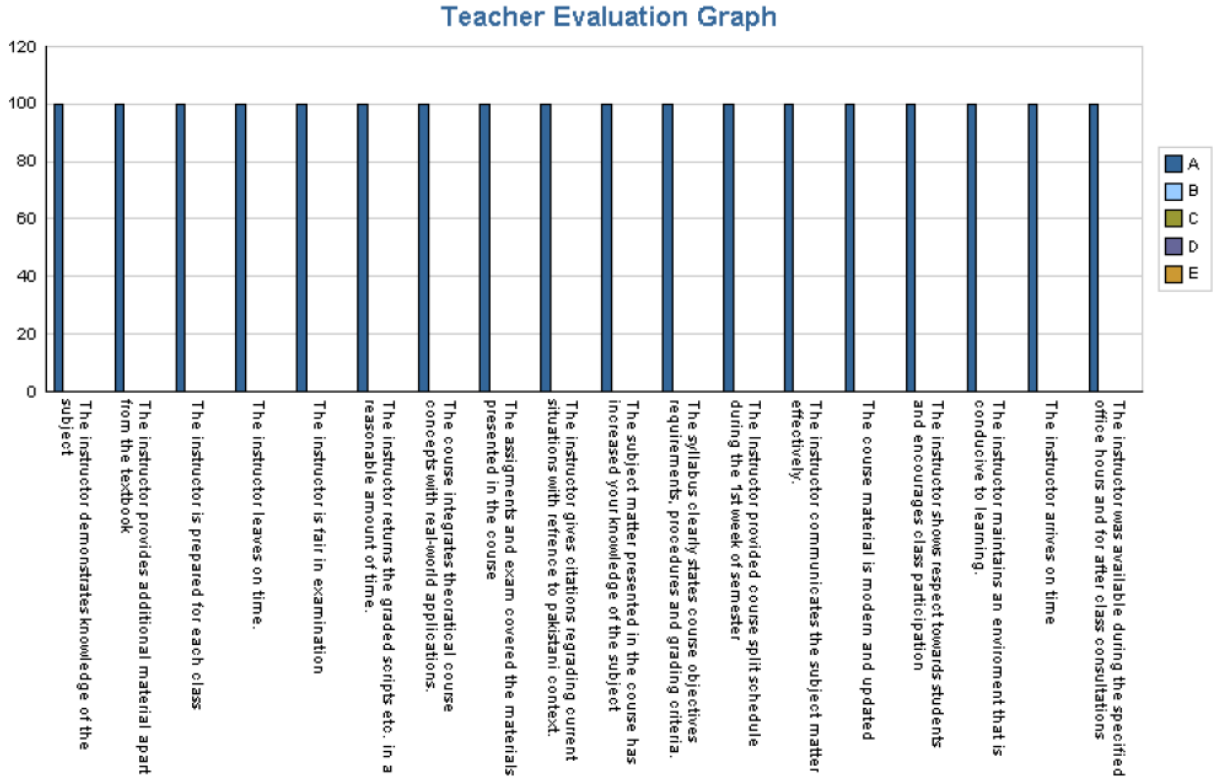

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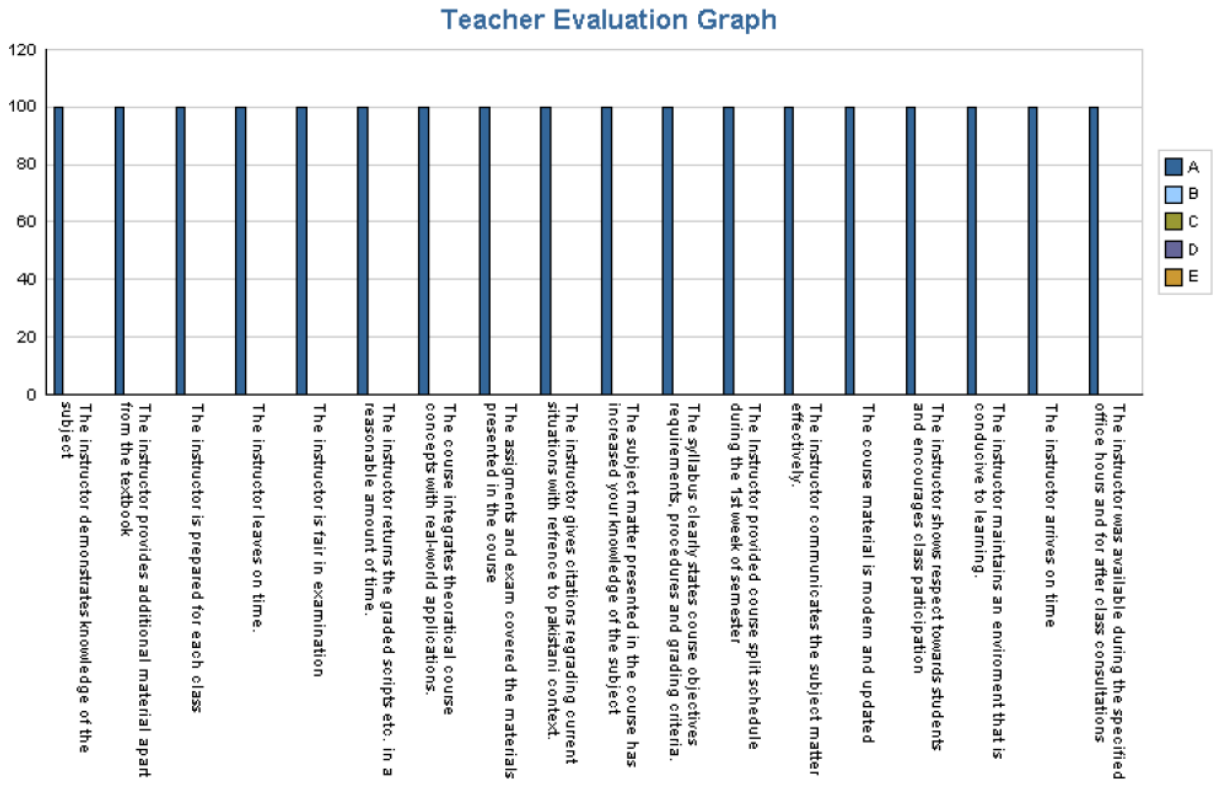

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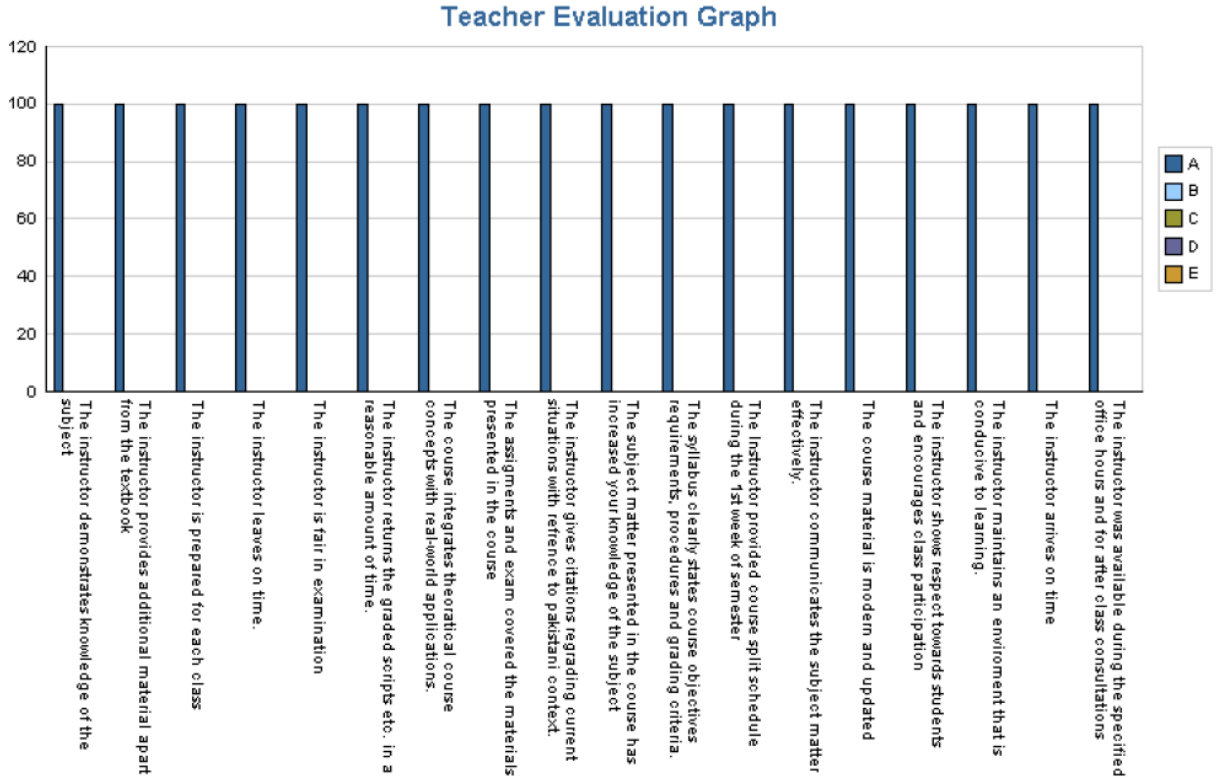
Mr. Muhammad Amin (RSG-704, Fall 14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor was available during the specified office hours”, “The instructor returned the graded scripts in reasonable time”, “The instructor communicates the subject matter effectively”, “the instructor maintain conducive environment for learning”, “the instructor arrived on time in classes” and “The instructor is fair in examinations”.



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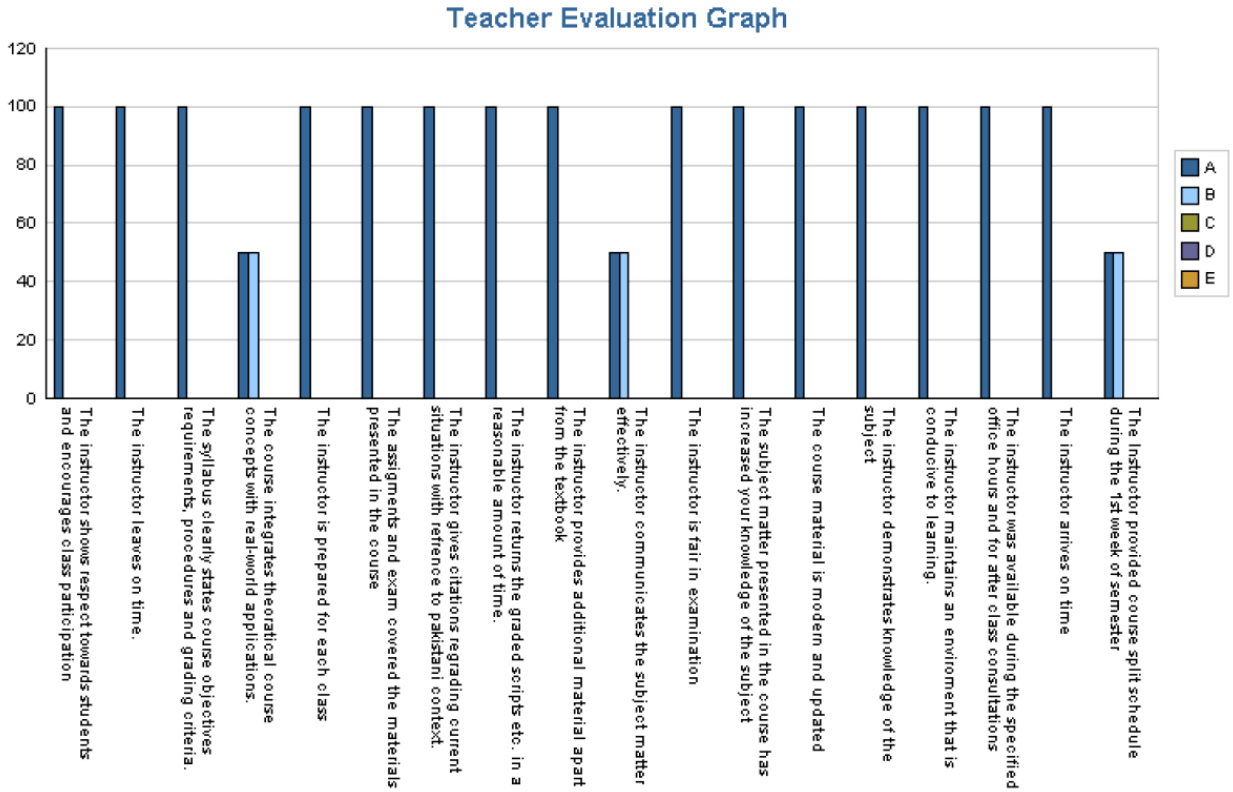

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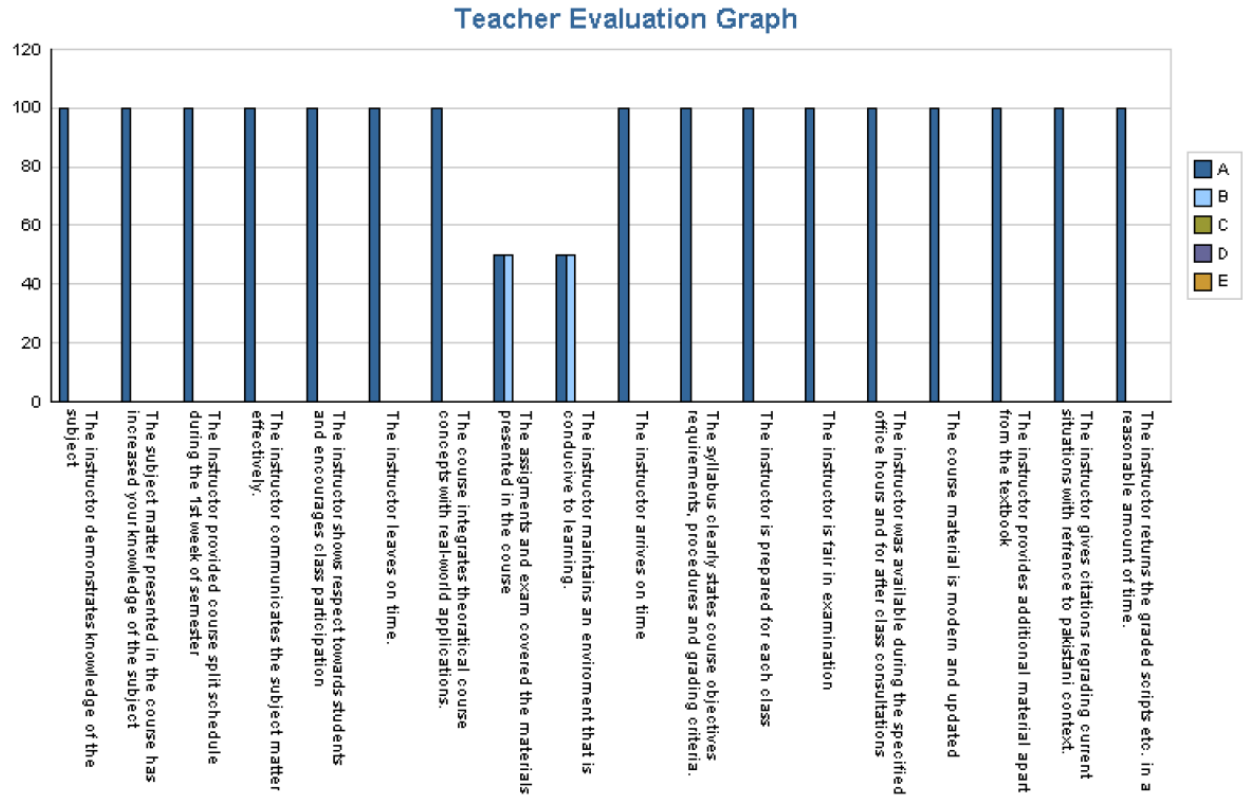

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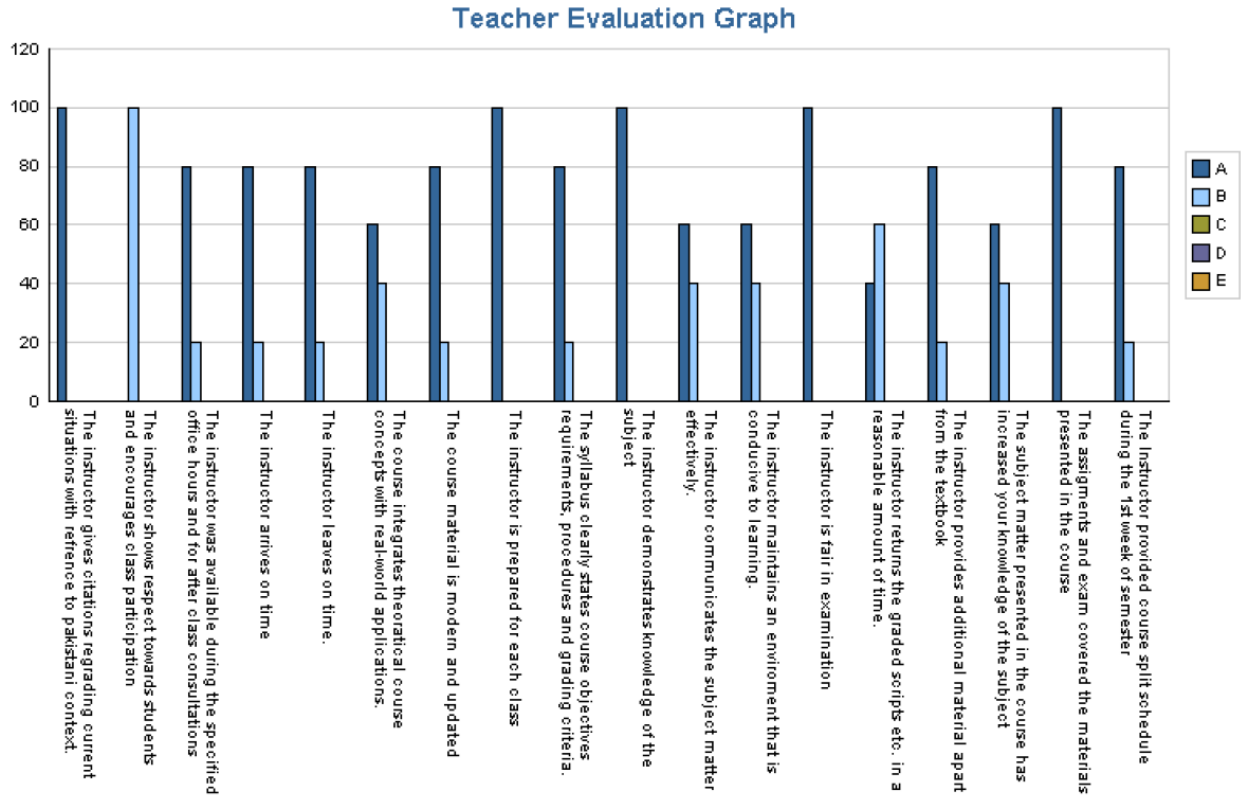
Dr. Mobushir Riaz Khan (RSG-711, Fall 14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that "The instructor demonstrates knowledge of the subject", "The assignments and exams covered the subject matter presented", "the instructor is prepared for each class" and "The instructor is fair in examinations". 80% strongly agreed that "The instructor was available during the specified office hours" and "the course material was modern and updated". Whereas, 60 percent strongly agreed that "The course integrates theoratical course concepts with real-world applications", "The instructor communicates the subject matter effectively", "the instructor maintain conducive environment for learning" and "The instructor returned the graded scripts in reasonable time".



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Dr. Mobushir Riaz Khan (RSG-751, Fall 14)

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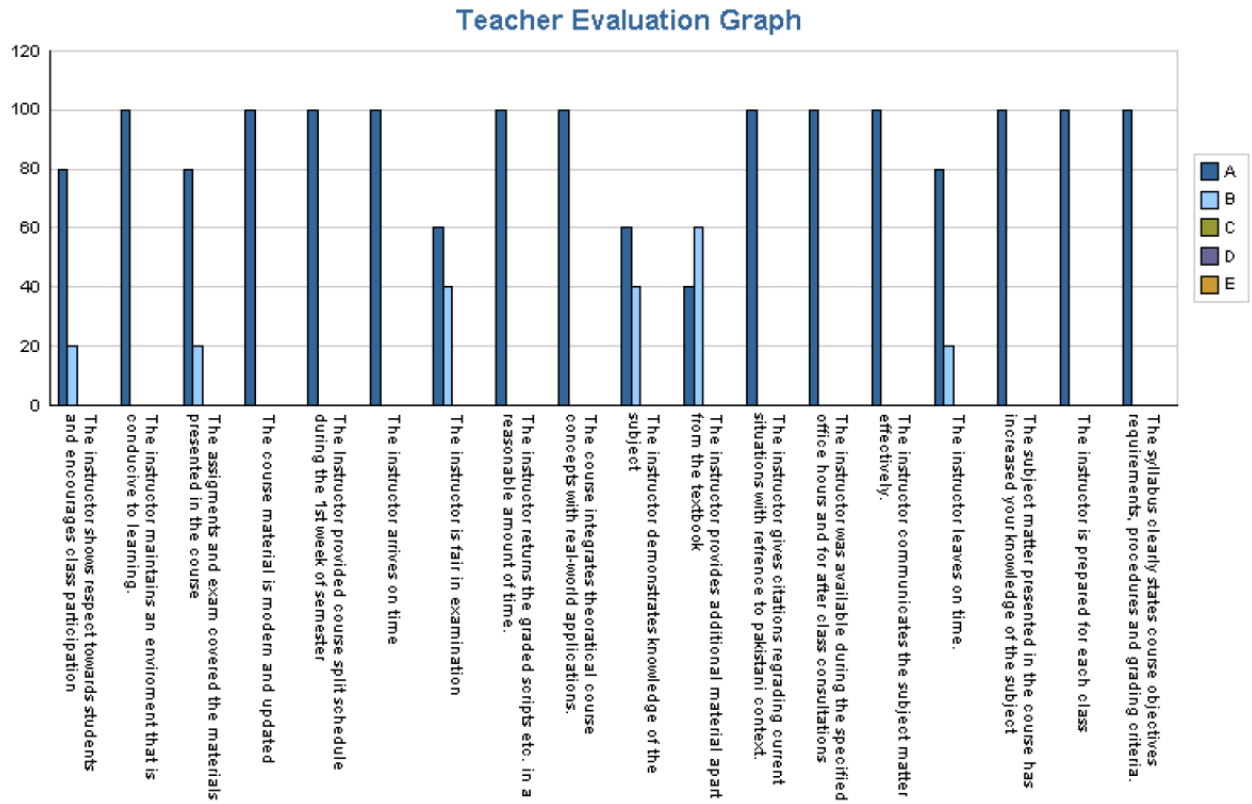

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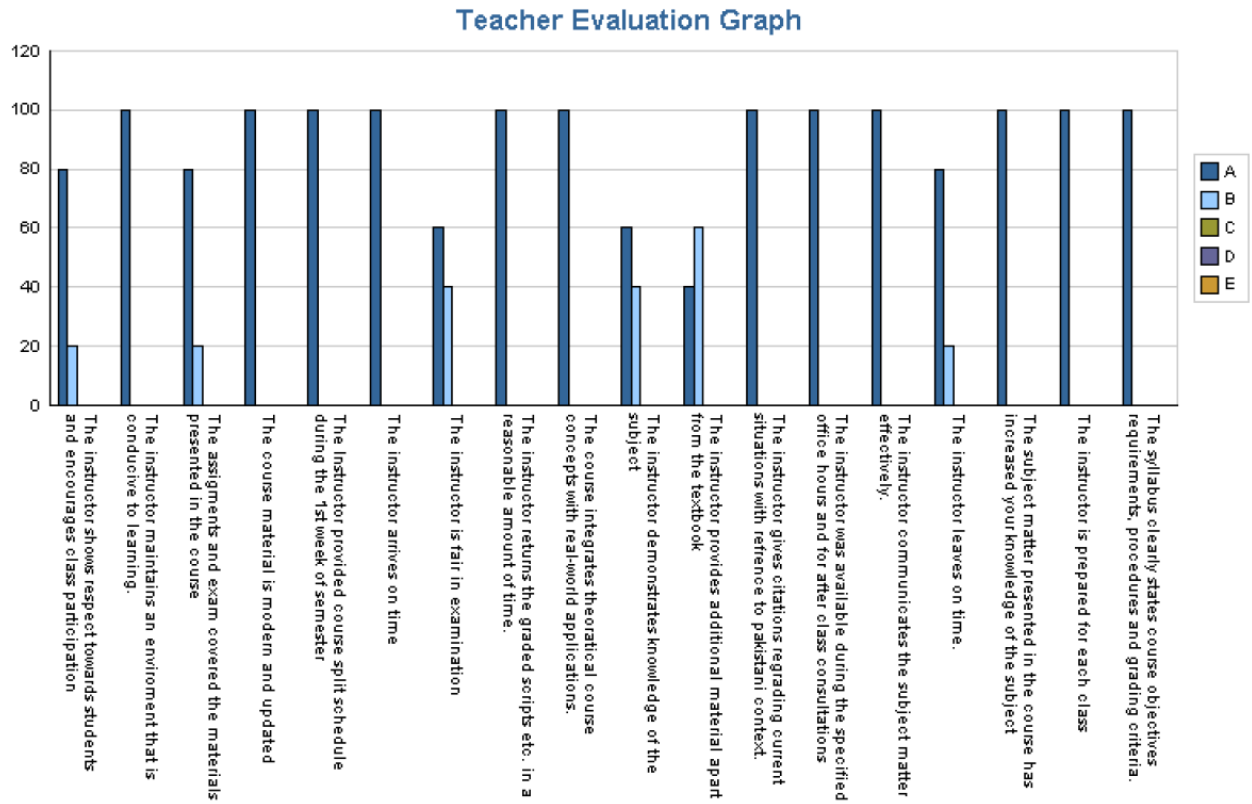
Dr. Mobushir Riaz Khan (RSG-751, Fall 14)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agreed that "the instructor maintain conducive environment for learning", "the instructor is prepared for each class", "The instructor communicates the subject matter effectively", "The instructor was available during the specified office hours", "The course integrates theoratical course concepts with real-world applications", "The instructor returned the graded scripts in reasonable time" and "the course material was modern and updated". 80% strongly agreed that "The assignments and exams covered the subject matter presented". Whereas, 60 percent strongly agreed that "The instructor is fair in examinations". and "the instructor demonstrates knowledge of the subject".

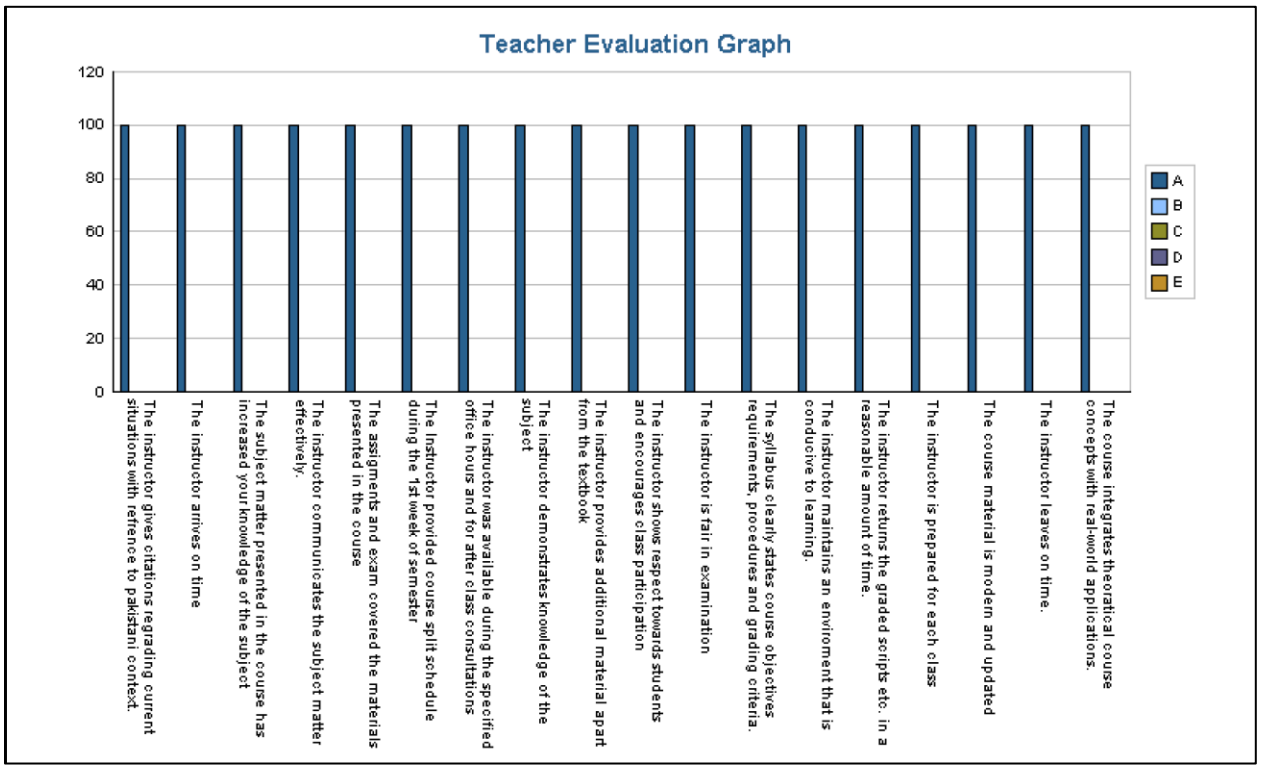


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-705, Spring 15)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor gives citations regarding current situations with reference to Pakistani context”, “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor was available during the specified office hours”, “The instructor returned the graded scripts in reasonable time”, “The instructor communicates the subject matter effectively”, “The instructor demonstrates knowledge of the subject”, “the instructor maintain conducive environment for learning”, “ the instructor arrived on time in classes” and “The instructor is fair in examinations”.

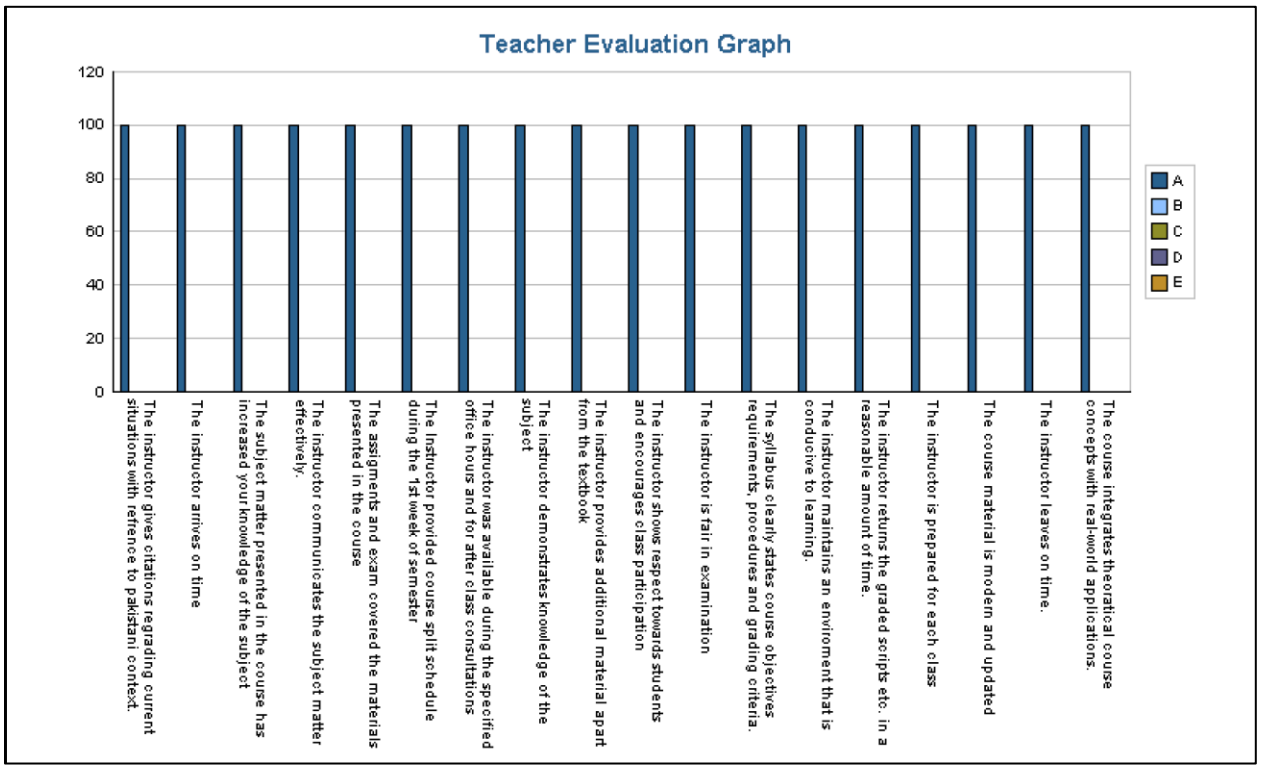


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-708, Spring 15)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor gives citations regarding current situations with reference to Pakistani context”, “the instructor provides additional material apart from textbook”, “The course integrates theoratical course concepts with real-world applications”, “The instructor was available during the specified office hours”, “The instructor returned the graded scripts in reasonable time”, “The instructor communicates the subject matter effectively”, “The instructor demonstrates knowledge of the subject”, “the instructor maintain conducive environment for learning”, “ the instructor arrived on time in classes” and “The instructor is fair in examinations”.

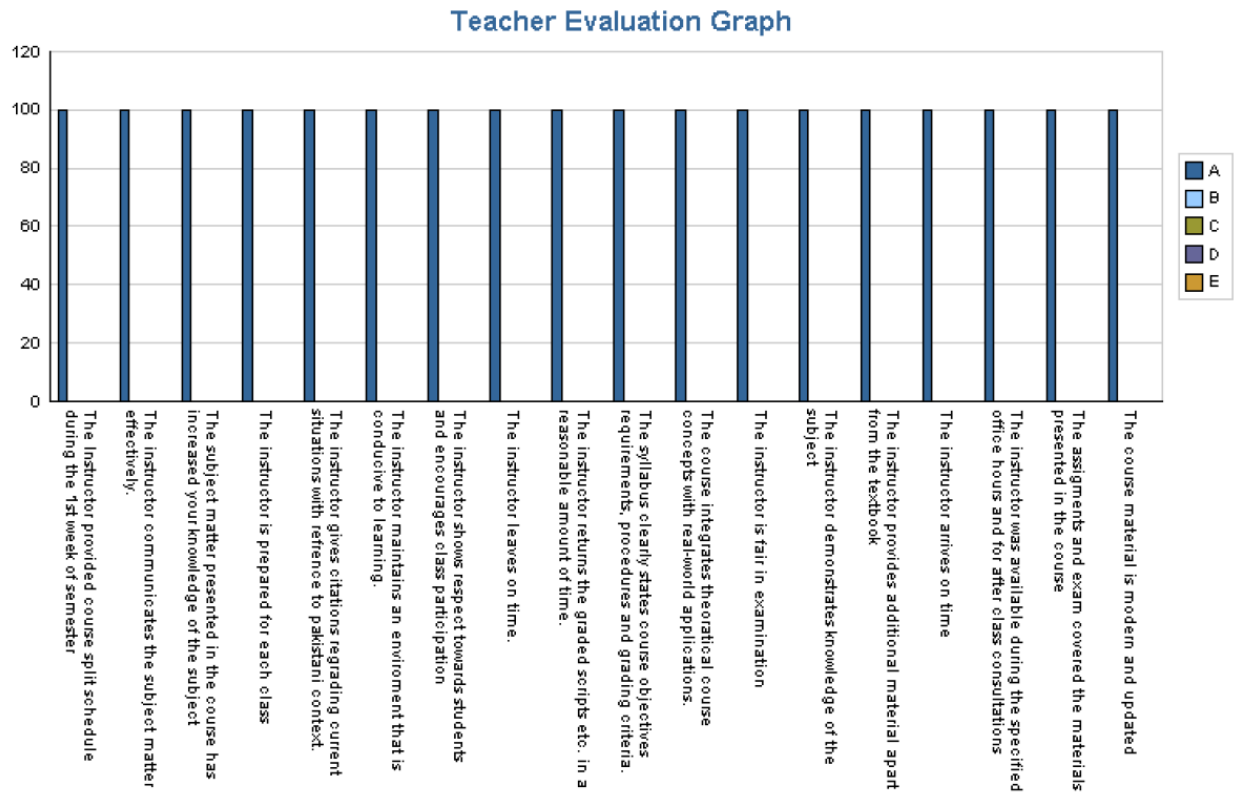


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-720, Spring 15)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", “the instructor gives citations regarding current situations with reference to Pakistani context”, “The course integrates theoratical course concepts with real-world applications”, “The instructor was available during the specified office hours”, “The instructor returned the graded scripts in reasonable time”, “The instructor communicates the subject matter effectively”, “The instructor demonstrates knowledge of the subject”, “the instructor maintain conducive environment for learning”, “ the instructor arrived on time in classes” and “The instructor is fair in examinations”.

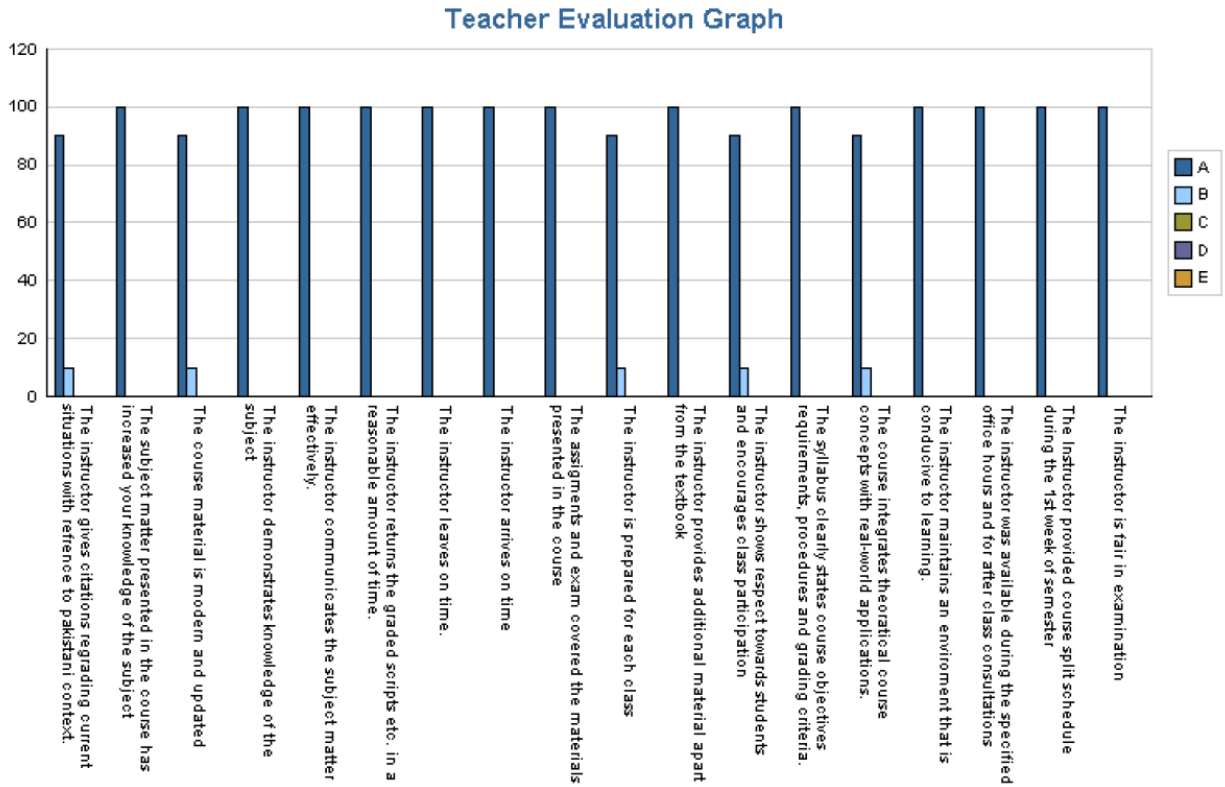


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-751, Spring 15)

Evaluation: The graph presented below shows evaluation of the instructor. 100 percent of the students strongly agree that the "instructor demonstrates knowledge of the subject", "The instructor was available during the specified office hours", "The instructor returned the graded scripts in reasonable time", "The instructor communicates the subject matter effectively", "The instructor demonstrates knowledge of the subject", "the instructor maintain conducive environment for learning" and "The instructor is fair in examinations". Whereas, 90% stongly agreed that "The course integrates theoratical course concepts with real-world applications", "The course material is modern and updated" and "The instructor is prepared for each class".



Where:

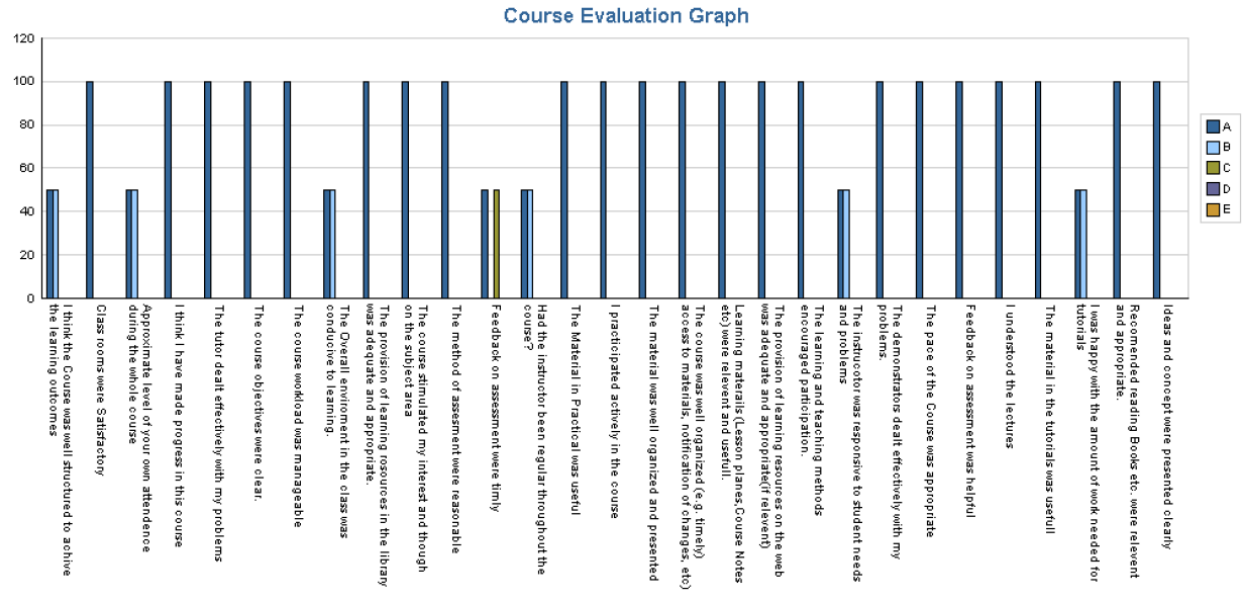
A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Course Evaluation

Following courses were evaluated by the department in the fall 2013-14, spring 2014, fall 2014-15 and spring 2015 Semester. Graphical presentation of the assessment is given below.

Dr. Mobushir Riaz Khan (RSG-701, Fall 2013-14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agree that the "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "instructor was responsive to students' needs and problems", "Feedback on assessment was helpful", "course workload was manageable" and "The course objectives were clear". 50% of students give opinion that "the overall environment in the class was conducive for learning" and "the instructor was regular in the class". 50 percent of the students were uncertain about "the feedback on assessment was timely".

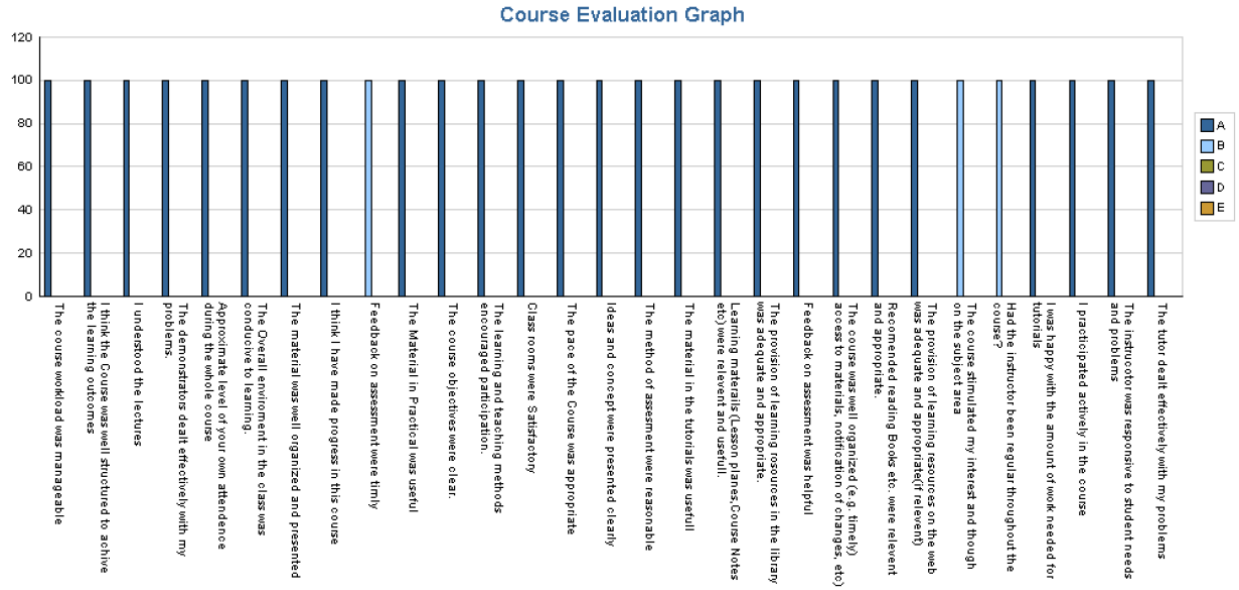


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-702, Fall 2013-14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agree that the "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "instructor was responsive to students' needs and problems", "Feedback on assessment was helpful", "course workload was manageable" and "The course objectives were clear". 90% of students give opinion that "the course stimulated my interest", "the instructor was regular in the class", and "the feedback on assessment was timely".

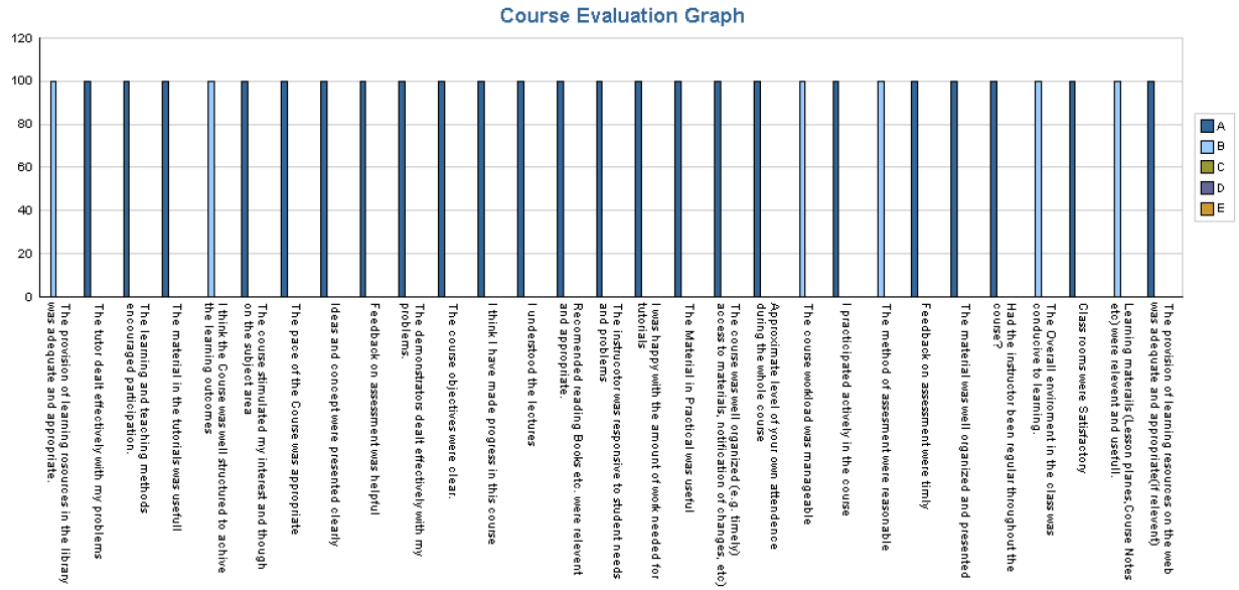


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Mr. Muhammad Amin (RSG-703, Fall 2013-14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agree that the "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "instructor was responsive to students' needs and problems", "the instructor was regular in the class", and "the feedback on assessment was timely", "Feedback on assessment was helpful", and "The course objectives were clear". 100% of students agreed that "the course was well structured", "the overall environment in the class was conducive for learning", "course workload was manageable", and "the material given was relevant to course".

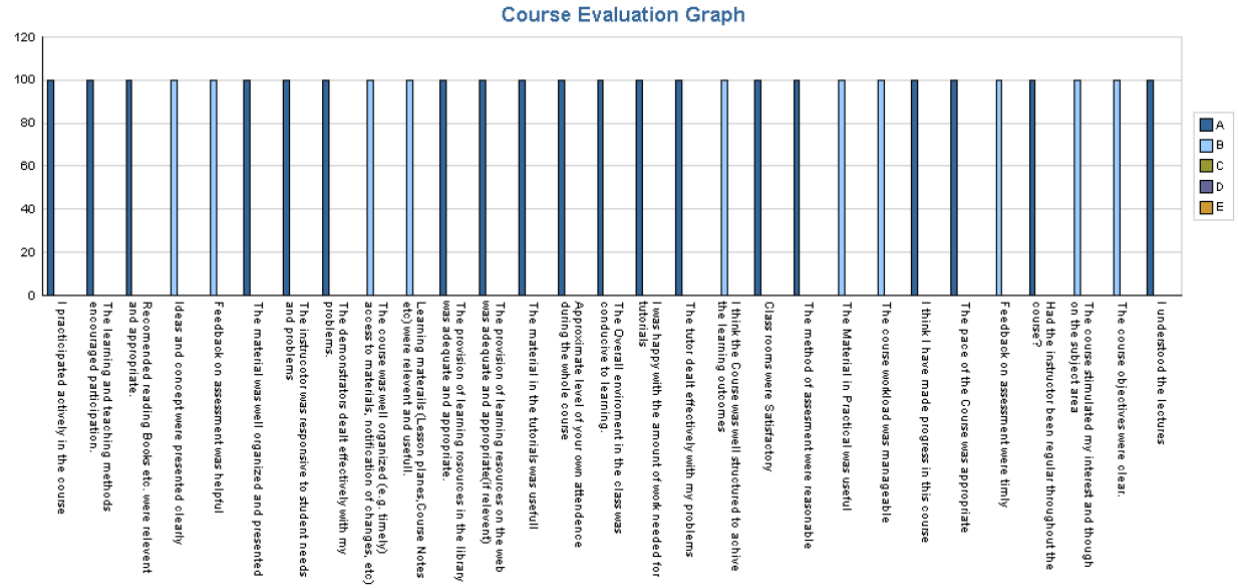


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Mr. Muhammad Amin (RSG-704, Fall 2013-14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agree that the "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", ""instructor was responsive to students' needs and problems", "the instructor was regular in the class and "The course objectives were clear". 100% of students agreed that "the course was well structured", "course workload was manageable", "the feedback on assessment was timely", "Feedback on assessment was helpful", and the overall environment in the class was conducive for learning".

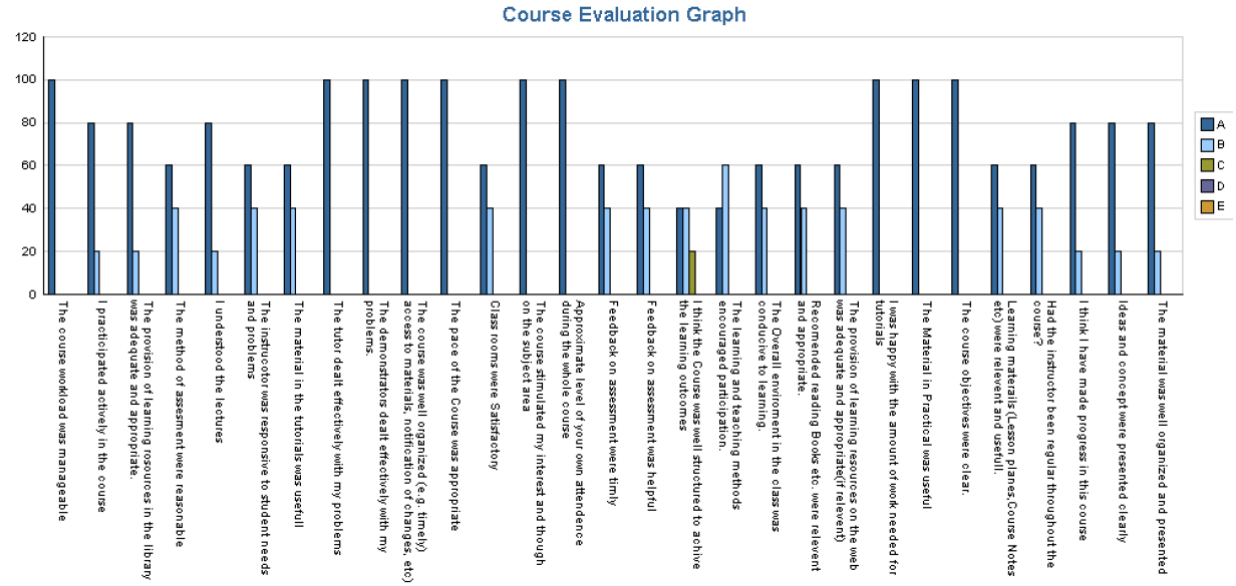


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-705, Spring 14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agree that "The course objectives were clear", "instructor was responsive to students' needs and problems", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable". 80% of students strongly agreed that "The ideas were presented clearly", "the material was well presented", and "the instructor was regular in the class". 60 percent of the students strongly agreed that "the learning and teaching methods encourage participation".

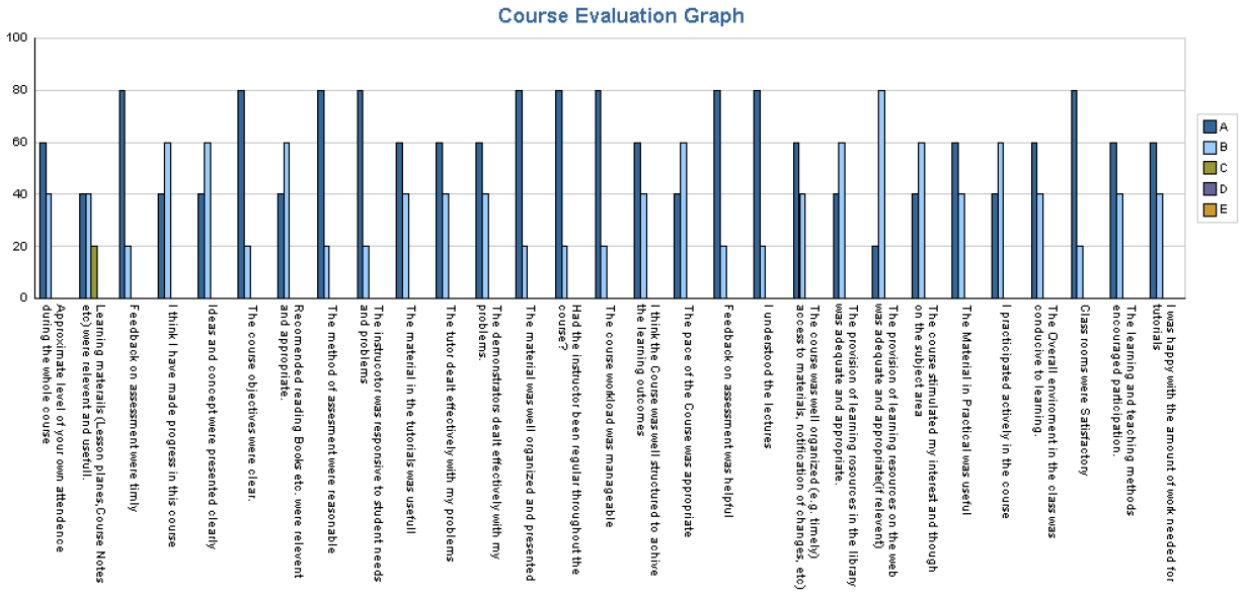


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Siddiqullah Baig (RSG-706, Spring 14)

Evaluation: The graph shows evaluation of the course. 80 percent of the students strongly agree that "The course objectives were clear", "The class rooms were satisfactory", "instructor was responsive to students' needs and problems", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable". 60% of students strongly agreed that "The ideas were presented clearly", "the material was well presented", "The overall environment in the class was conducive for learning", "the instructor was regular in the class" and "the learning and teaching methods encourage participation".

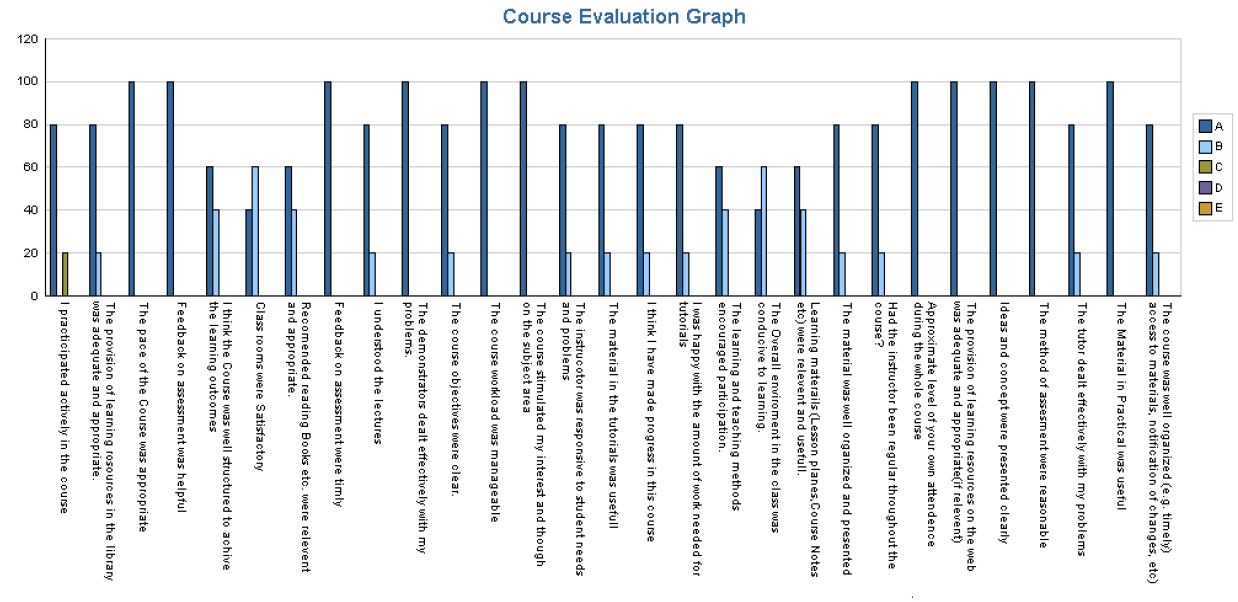


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-717, Spring 14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agree that the "The ideas were presented clearly", "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable". 80% of students strongly agreed that "The course objectives were clear", "the material was well presented", "instructor was responsive to students' needs and problems". 60 percent of the students agreed that "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy".

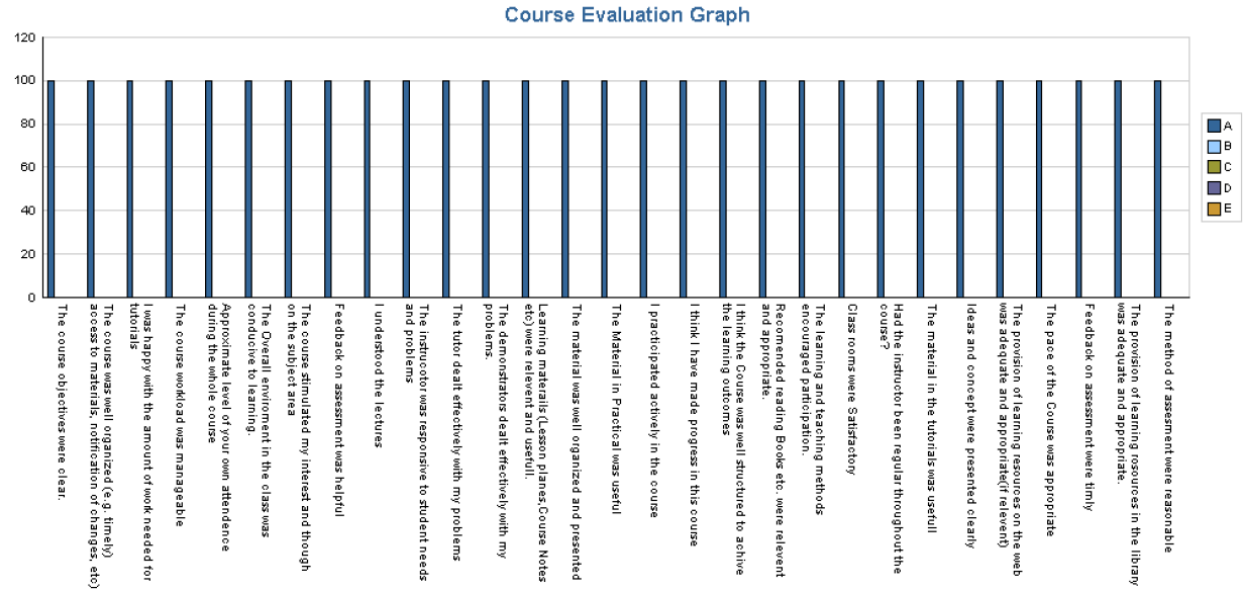


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Mr. Saif ur Rehman Khalid (RSG-701, Fall 14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that the "The ideas were presented clearly", "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable", "The course objectives were clear", "the material was well presented", "instructor was responsive to students' needs and problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy".

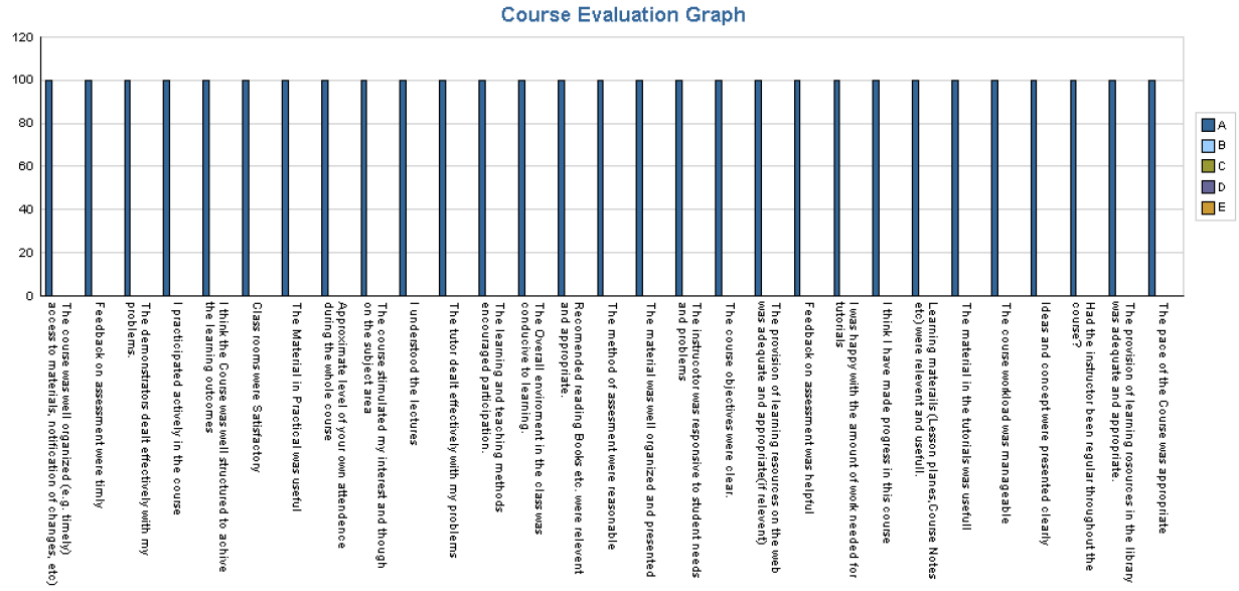


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-702, Fall 14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that the “The ideas were presented clearly”, “The class rooms were satisfactory”, “the instructor dealt effectively with their problems” and “the material provided was helpful for them”, ”Feedback on assessment was helpful”, “the feedback on assessment was timely”, "course workload was manageable”, “The course objectives were clear”, “the material was well presented”, “instructor was responsive to students’ needs and problems”, “the overall environment of the class was conducive for learning” and “the class rooms were satisfactoy”.

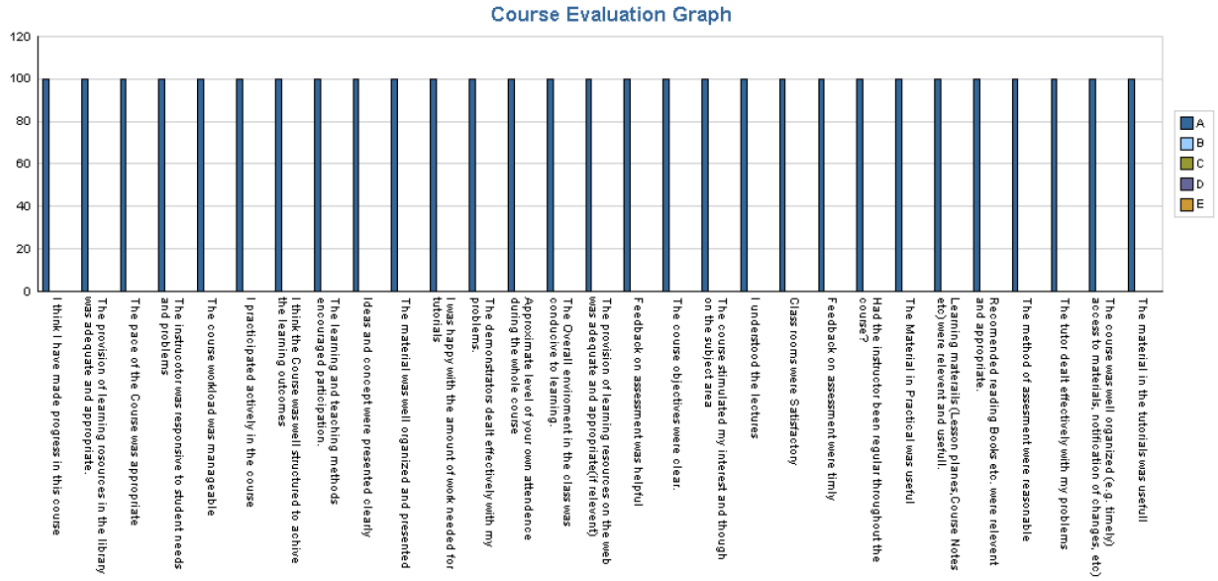


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Mr. Muhammad Amin (RSG-703, Fall 14)

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that the "The ideas were presented clearly", "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable", "The course objectives were clear", "the material was well presented", "instructor was responsive to students' needs and problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy".

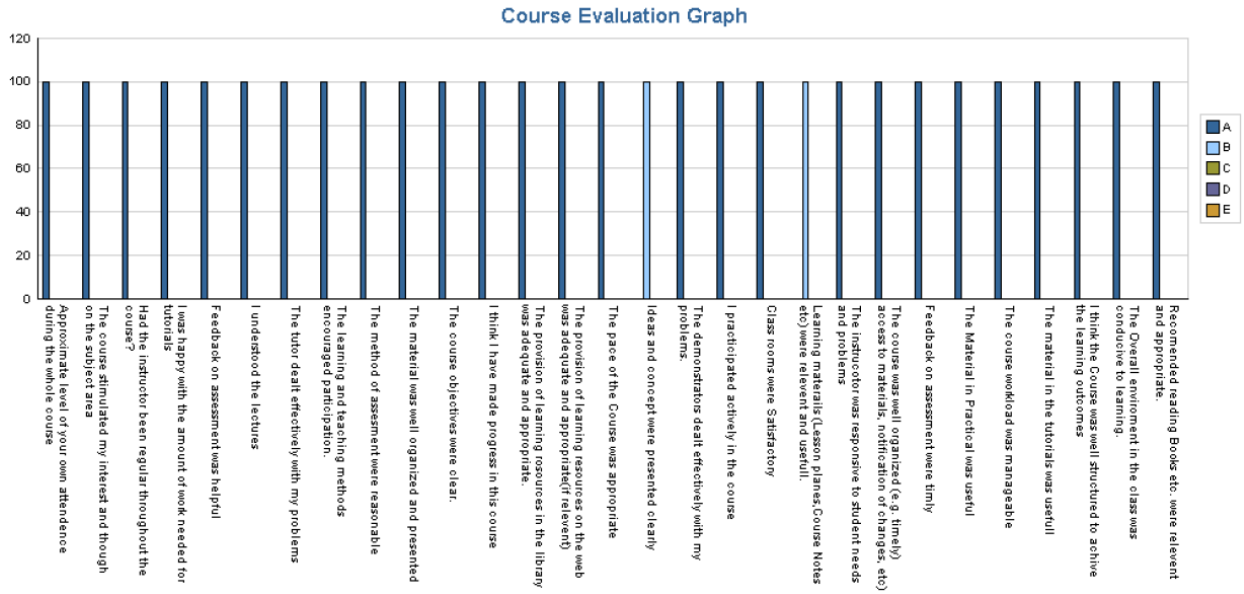


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Mr. Muhammad Amin (RSG-704, Fall 14)

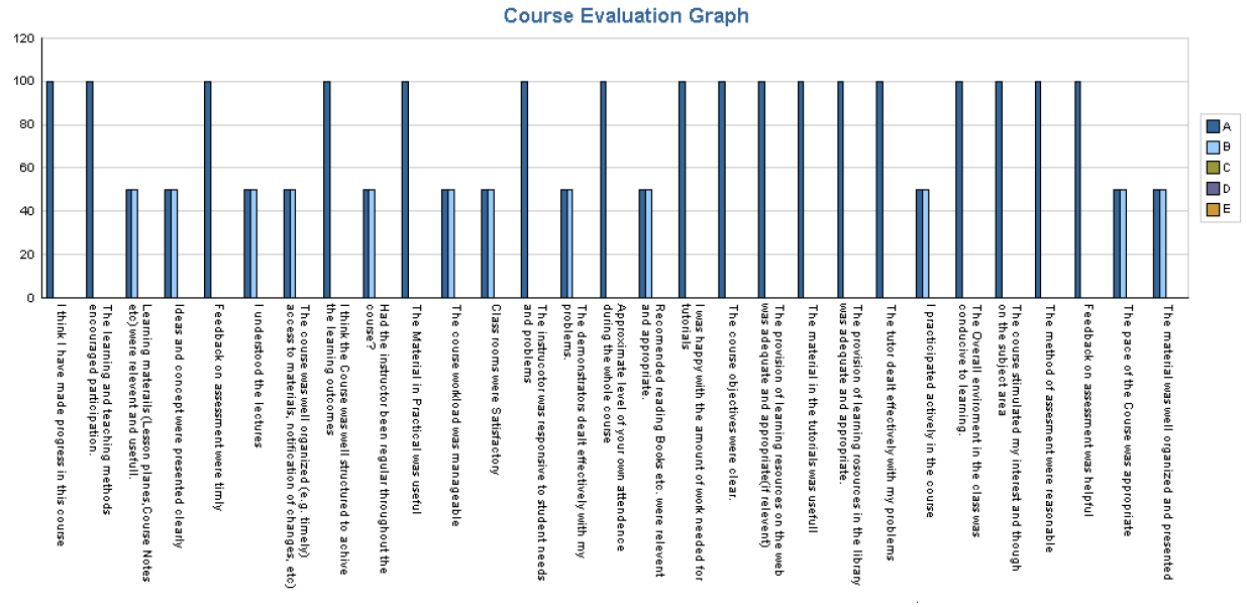
Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The class rooms were satisfactory", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable", "The course objectives were clear", "the material was well presented", "instructor was responsive to students' needs and problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy". 90 percent students agreed that "The ideas were presented clearly" and "the material given was relevant to the course".



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

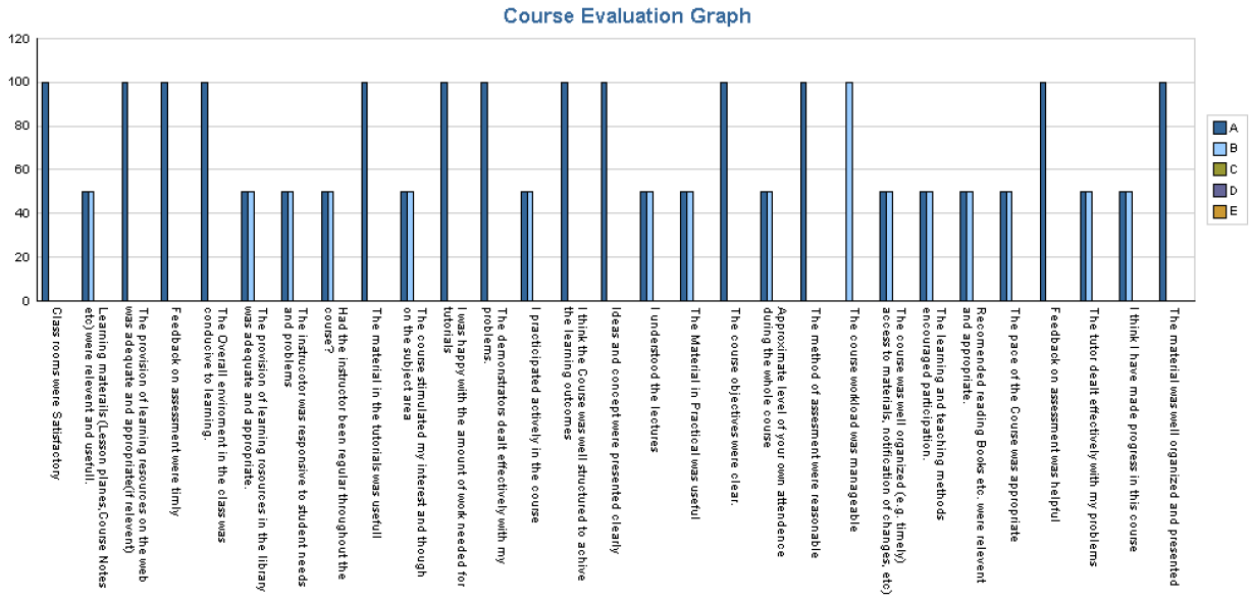
Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that “The course was well structured”, and “the material provided was helpful for them”, ”Feedback on assessment was helpful”, “the feedback on assessment was timely”, “The course objectives were clear”, “the material was well presented”, “instructor was responsive to students’ needs and problems”, “the overall environment of the class was conducive for learning” and “the class rooms were satisfactoy”. 50 percent students strognly agreed that “ideas and concepts were presented clearly”, “the instructor dealt effectively with my problems”, "course workload was manageable”, “The pace of the course was appropriate”, “The ideas were presented clearly” and “The class rooms were satisfactory”.



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

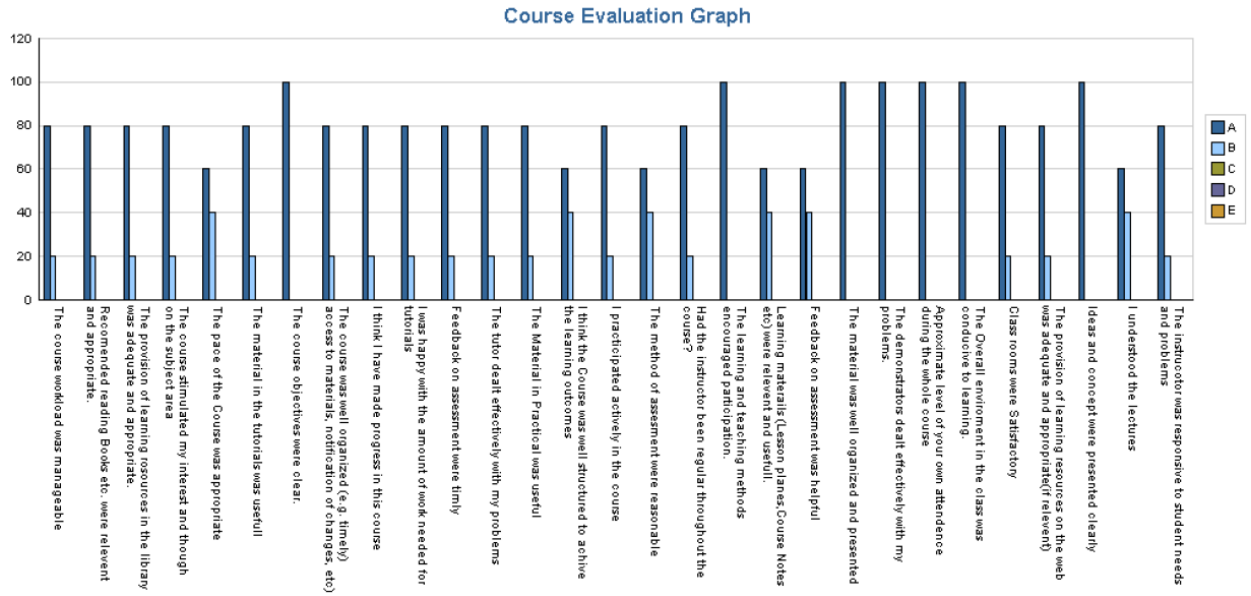
Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The class rooms were satisfactory", "ideas and concepts were presented clearly", "the instructor dealt effectively with my problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy", "The course was well structured", and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "The course objectives were clear", and "the material was well presented". 50 percent students strognly agreed that "The pace of the course was appropriate", "instructor was responsive to students' needs and problems" and "The provision of resources in the library was appropriate".



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

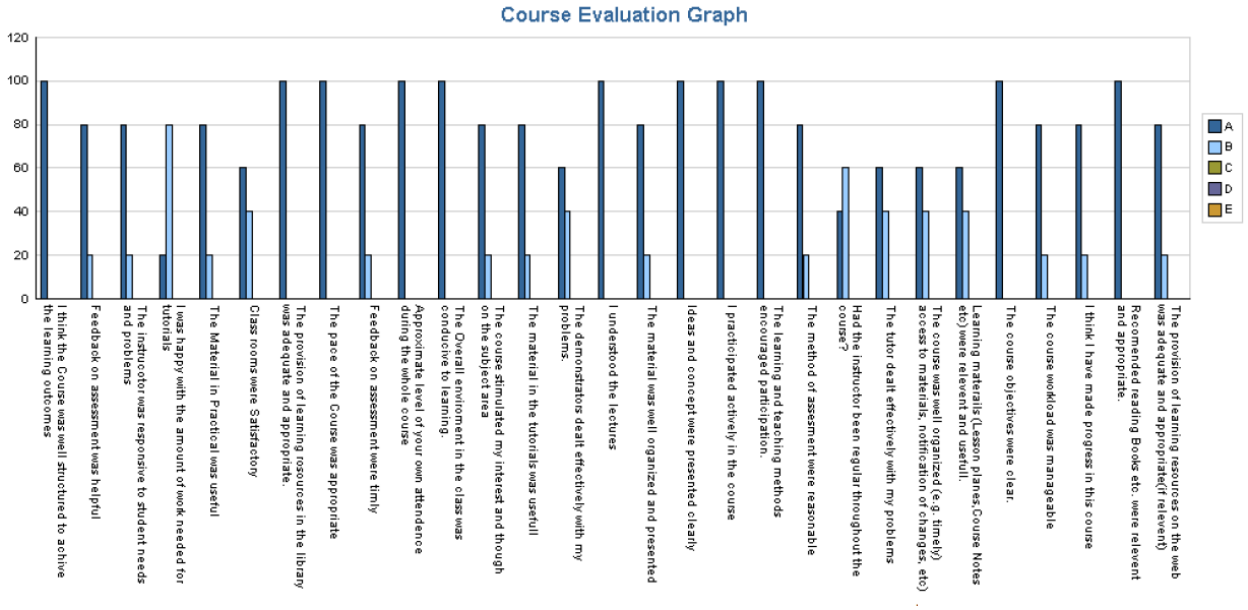
Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The course objectives were clear", "the material was well presented", "the overall environment of the class was conducive for learning", "the instructor dealt effectively with my problems", and "The ideas and concepts were presented clearly". 80 percent students strognly agreed that "The pace of the course was appropriate", "The class rooms were satisfactory", and "the class rooms were satisfactoy", "The course was well structured", "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "instructor was responsive to students' needs and problems" and "The provision of resources in the library was appropriate".



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

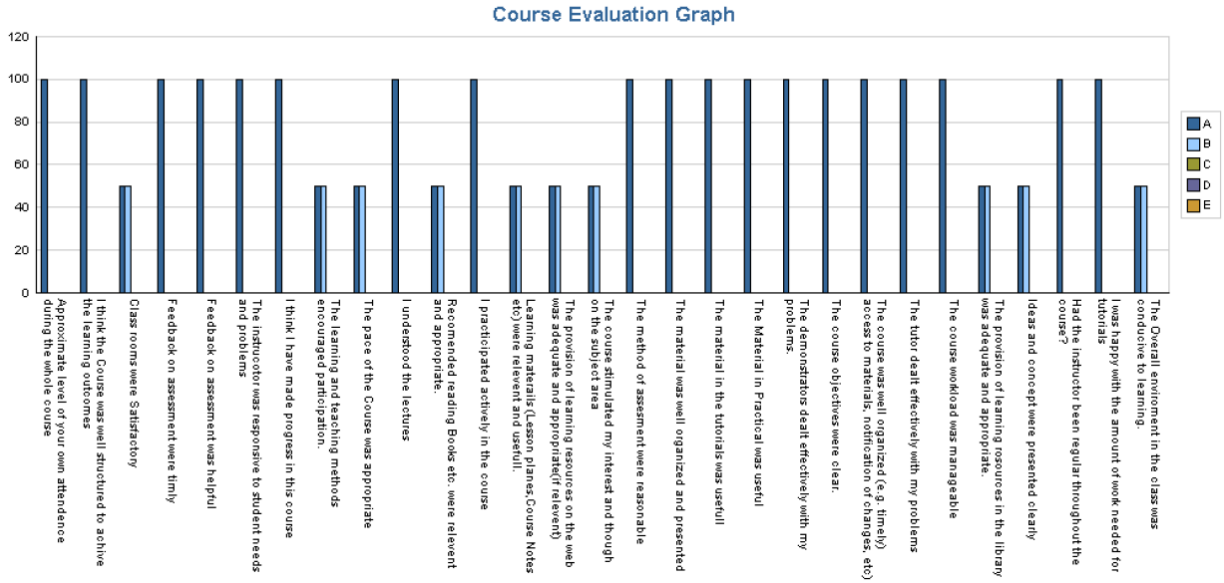
Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The provision of resources in the library was appropriate", "The pace of the course was appropriate", "The course objectives were clear", "the material was well presented", "the overall environment of the class was conducive for learning" and "The ideas and concepts were presented clearly". 80 percent students strognly agreed that, and "the class rooms were satisfactoy", "The course was well structured", "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "instructor was responsive to students' needs and problems". 60% strongly agreed that "The class rooms were satisfactory" and "the instructor dealt effectively with my problems".



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The course was well structured", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable", "The course objectives were clear", "the material was well presented", "instructor was responsive to students' needs and problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy". 50 percent students strognly agreed that "ideas and concepts were presented clearly", "The ideas were presented clearly" and "The class rooms were satisfactory".

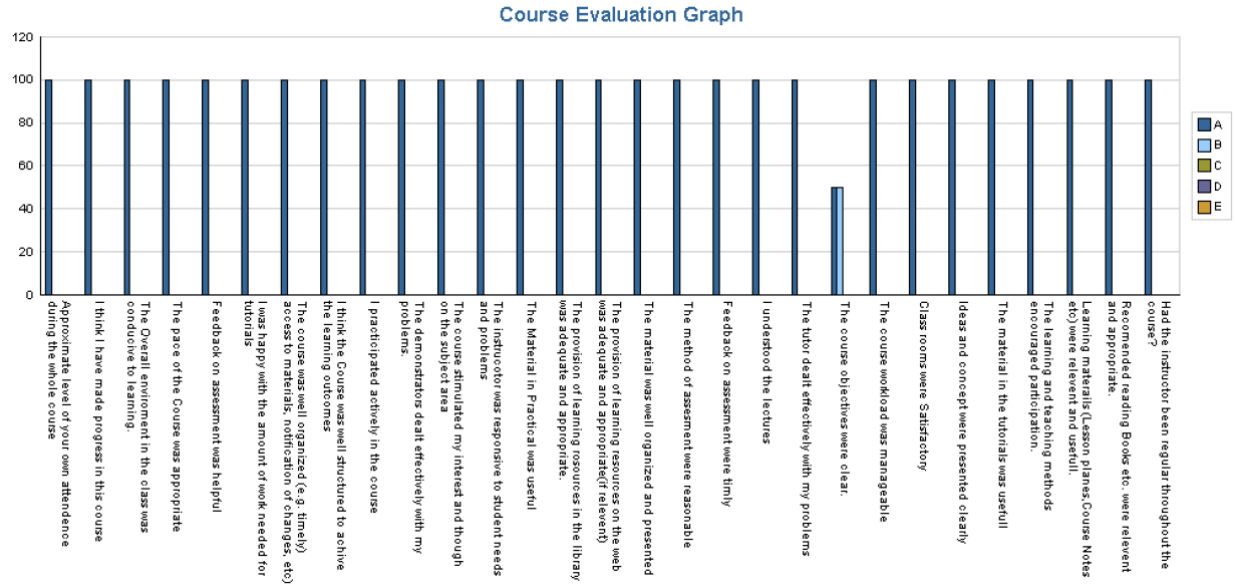


Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Dr. Mobushir Riaz Khan (RSG-708, Spring 15)

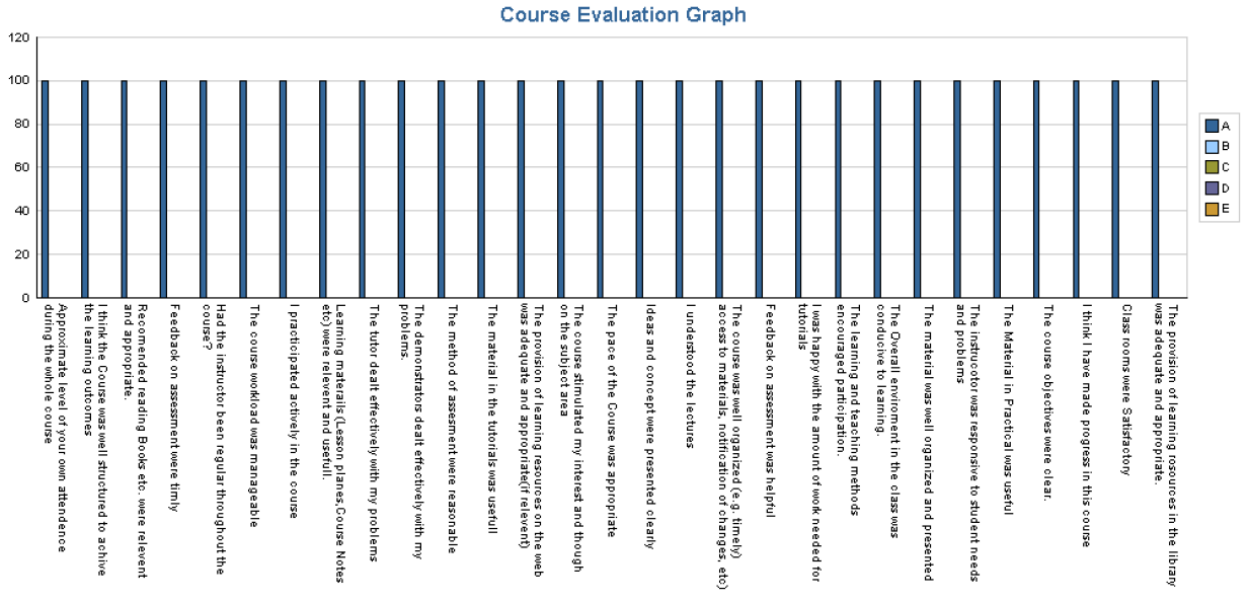
Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The course was well structured", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable", "the material was well presented", "instructor was responsive to students' needs and problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy", "ideas and concepts were presented clearly", "The ideas were presented clearly" and "The class rooms were satisfactory". 50 percent students strognly agreed that "course objectives were clear".



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

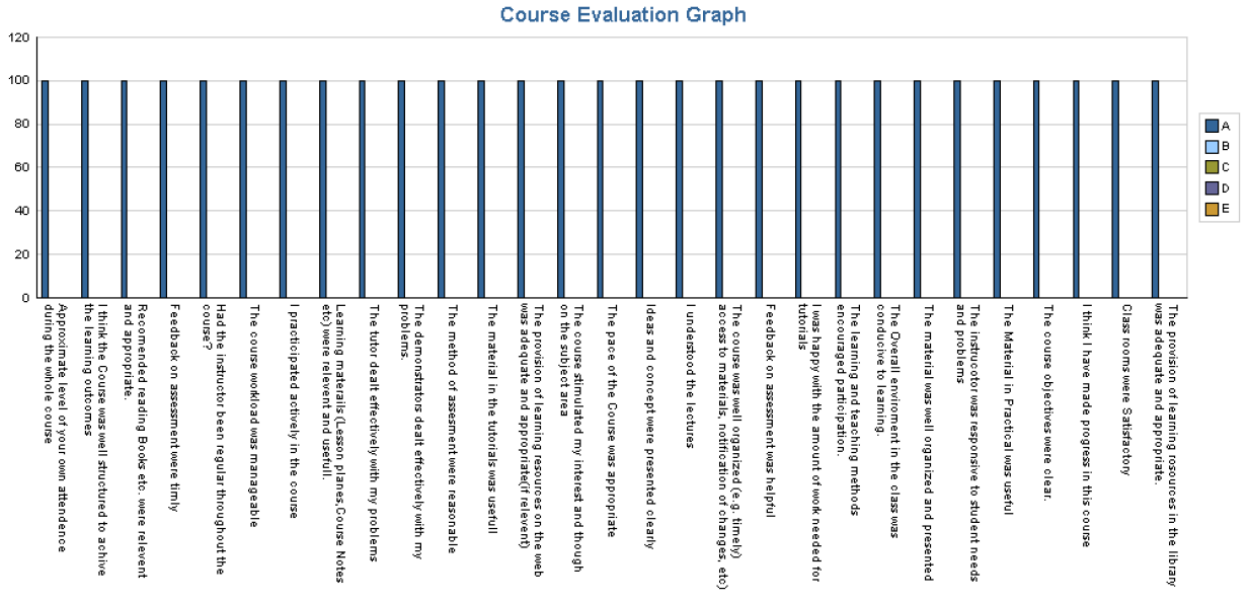
Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The course was well structured", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable", "The course objectives were clear", "the material was well presented", "instructor was responsive to students' needs and problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy", "ideas and concepts were presented clearly", "The ideas were presented clearly" and "The class rooms were satisfactory".



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Evaluation: The graph shows evaluation of the course. 100 percent of the students strongly agreed that "The course was well structured", "the instructor dealt effectively with their problems" and "the material provided was helpful for them", "Feedback on assessment was helpful", "the feedback on assessment was timely", "course workload was manageable", "The course objectives were clear", "the material was well presented", "instructor was responsive to students' needs and problems", "the overall environment of the class was conducive for learning" and "the class rooms were satisfactoy", "ideas and concepts were presented clearly", "The ideas were presented clearly" and "The class rooms were satisfactory".



Where:

A = Strongly Agree, B = Agree, C = Uncertain, D = Disagree, E = Strongly Disagree

Best Aspects of the Program

- Highly qualified and dedicated faculty with diverse background caters the needs of students of various fields.
- High level of co-operation & helping attitude of majority faculty members for all students in research and extra-curricular activities.
- The program curriculum is meeting the international job market and HEC requirements. This developed the necessary subject theoretical, practical and analytical skills in the students to excel in their fields.
- The program always promotes the innovative research ideas to solve the real world problems of the world in general and Pakistan in particular.
- Encouragement to work as team in the department.
- Independence in research thus promoting creativity.
- Research collaboration with national and international agencies.

Weaknesses:

- Faculty members are burdened enough with administration responsibilities that they can spare only short time for students.
- Faculty members lack internet facility in their rooms hindering the process of research and development by causing delay in carrying out various responsibilities including SAR preparation.
- Faculty student ratio is high.
- Lack of mechanism for reviewing the progress of the research of PhD scholars.
- Lack of funds hinders the progress of research of PhD scholars.

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

Regular Assessment Process started recently and in future assessments results will be incorporated accordingly. Following are the strength and weaknesses identified.

Strengths of the Department

1. The department is honored with highly qualified faculty graduated from prestigious research institutes. The faculty members have well acquaintance of their respective subjects and having vast knowledge of current geo-spatial technologies.
2. Our faculty believes in quality research and had successfully completed national and international projects.
3. The entire faculty members are involved in research directly or indirectly as supervisor or committee member of the post graduate students and various research projects.

Weaknesses of the Department

1. Work load of teachers is more than enough according to the criteria set by HEC. Due to this teachers have no time to focus on their individual research along with other team members for publications in reputed journals as a first author. This tremendous work load also hinders their progress to write good projects.
2. Some teachers even don't have internet and official desktops.
3. Dedicated internet connection and lab for PhD students is lacking.
4. The available lab remained closed other than class timings due to absence of lab engineers.

5. The department doesn't have any MoU with reputed universities for exchanging students and researchers for advancement of research and skills.
6. Process and mechanisms of the degree requirements is not shared with students properly.
7. Students are not given university email ID.

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

The evaluation process indicated high efficiency of system and satisfactory impact of outcomes. Following tables present the research publications of the faculty and the events organized by the department.

Table 1: Present performance measures for research activities:

Faculty	Journal Publications	Conference Proceedings	Projects
Dr. Mobushir Riaz Khan	23	07	09
Dr. Siddequllah Baig	02	07	03
Dr. Naveed Tahir	15	01	05

Table 2: Short courses, Seminars, Workshops and Conferences arranged by the Department Year Short Courses Seminars Workshops/Conferences

Year	Short Courses	Seminars
2013-14	01	01
2014-15	01	02

2. CRITERION 2: CURRICULUM DESIGN AND ORGANIZATION

Degree Title: PhD in Remote Sensing & GIS

Curriculum for PhD in Remote Sensing & GIS was designed in accordance with the international educational standards as well as in agreement with national HEC (Higher Education Commission) standards. Experts and learned professors, subject specialists form other universities and research organizations at national were involved to design the curriculum. Depending upon need curriculum is revised and updated. At department level, Board of Studies, which is comprised of senior faculty members, is responsible for updating the curriculum. This body is authorised to formulate syllabus and course contents. The Chairman of the Department in this regard acts as a Convener. The courses are then sent to the Board of Faculty for approval. The Dean of the Faculty, being Convener of this body, conduct meeting. As per university rules, courses after the approval from the Faculty Board, are placed before the University Academic Council for final approval.

Criteria for Admission

MS in space sciences, RS/GIS or science field.

Degree Requirements:

As a whole, a student has to study 68 credit hours. First two semesters are of course work of minimum 18 credit hours and afterwards the research thesis of 50 credit hours. Students for the research work are provided with well-equipped labs and projects are carried out under supervision of highly qualified faculty members. The research topics are complied with the aims and objectives of department. Minimum Grade Point Average (GPA) for obtaining the degree is 3.0.

Examination:

In theory exam, student's evaluation is done by mid-term examination, assignments and quizzes during the semester and final examination. Both the mid-term and final examinations are compulsory. A student, who misses the mid-term examination, is not allowed a make-up examination. In case a student does not appear in the final examination of a course, he/she shall be deemed to have failed in that course. Similarly, student has to clear practical exam to pass the course. Weightage of each component is given below.

Eligibility for Examination:

A student is eligible to appear in the examination provided he/she has attended at least 75% classes.

Scheme of studies and Course contents of PhD Remote Sensing & GIS

Table 3: PhD credit hours distribution

S.No	Course Structure	Credit Hours	Courses
01	Core Courses	12	4
02	Elective/Specialized	06	2
03	Thesis	50	-
	Total	**68**	**6**

Those students who have not done their MS in Remote Sensing and GIS have to qualify following deficiency courses.

Table 4: PhD deficiency courses

Course Code	Course Title
RSG-701	Introduction to GIS and Spatial Analysis
RSG-702	Introduction to Remote Sensing and Digital Image Processing
RSG-703	Introduction to GIS Database and Programming
RSG-704*	Prescribed Mathematics Course

Following is the list of courses being offered to PhD in remote sensing & GIS students.

Table 5: List of postgraduate core courses:

Course Code	Course Title	Credit Hours
RSG-705	Advanced Remote Sensing and Digital Image Processing	3(2-1)
RSG-706	Advanced Geographic Information Systems & Spatial Analysis	3(2-1)
RSG-707	Spatial Data Warehouse and Mining	3(3-0)
RSG-708	Advanced Research Methods	3(3-0)
RSG-709	Advanced Programming for Image Analysis	3(2-1)
RSG-710	Food security and Climate Change	3(3-0)
RSG-711	Applied Remote Sensing and GIS	3(2-1)
RSG-712	Statistical Data Analysis	3(2-1)
RSG-713	Geospatial Data Modeling	3(2-1)
RSG-714	Climate Data Analysis & Modeling	3(2-1)
RSG-715	Climatology	3(3-0)

Table 6: List of Ph.D. elective courses

Course Code	Course Title	Credits Hours
RSG-717	Geo-Information for Agriculture Monitoring	3(2-1)
RSG-720	Geo Spatial Analysis for Hydrology	3(2-1)
RSG-721	Biodiversity	3(3-0)
RSG-722	Management of Energy Resources	3(3-0)
RSG-723	Management of Mineral Resources	3(3-0)
RSG-724	Coastal Zone Management	3(3-0)
RSG-725	Natural Resources Exploration	3(3-0)
RSG-726	Natural Hazards and Disaster Management	3(3-0)
RSG-727	Environmental Pollution	3(3-0)
RSG-728	Environmental Impact Assessment	3(2-1)
RSG-729	Environmental Decisions and Conflict Resolution	3(2-1)
RSG-730	Disease Ecology	3(3-0)

RSG-731	Dynamics of Climate Change	3(3-0)
RSG-732	Land use Planning and Management	3(3-0)
RSG-733	District Planning and Management	3(2-1)
RSG-734	Urban Planning	3(2-1)
RSG-735	Infrastructure and Transport Planning	3(2-1)
RSG-736	E-Governance	3(3-0)
RSG-737	Planning and Management of Housing	3(2-1)
RSG-738	Poverty Alleviation	3(3-0)
RSG-739	Tourism Development	3(3-0)
RSG-740	Education and Health Services	3(3-0)
RSG-741	Business and Marketing	3(3-0)
RSG-742	Land Information and Management System	3(2-1)
RSG-743	Utilities and services Management	3(3-0)
RSG-744	Advanced Geodesy	3(3-0)
RSG-745	GIS Standards, Security and Ethics	3(3-0)
RSG-746	Integrated Geo-Technologies	3(2-1)
RSG-747	Corporate GIS	3(3-0)
RSG-748	Web GIS	3(2-1)
RSG-749	Fuzzy GIS	3(3-0)
RSG-750	Neural Networks and Artificial Intelligence	3(3-0)
RSG-751	Climate Change	3(3-0)
RSG-752	Emergency Response Planning and Management	3(3-0)
RSG-753	Flood Modeling	3(2-1)
RSG-754	Archeology	3(3-0)
RSG-755	GIS for Energy Management	3(3-0)
RSG-756	Advanced Agro-meteorology	3(2-1)
RSG-757	Ground Water Modeling	3(2-1)

RSG-758	Watershed Modeling and Management	3(2-1)
RSG-759	Climate Change & Sustainable Development	3(2-1)
RSG-760	Advanced Mobile GIS	3(2-1)
RSG-761	Advanced topics in GIS	3(2-1)
RSG-762	Advanced topics in Remote Sensing	3(2-1)
RSG-763	Risk Assessment and Mapping	3(2-1)
RSG-764	Early Warning System	3(2-1)
RSG-765	Spectroscopy Theory	3(3-0)
RSG-766	Numerical Modeling	3(3-0)
RSG-767	GPS and Applications	3(2-1)
RSG-768	Digital Photogrammetry	3(3-0)
RSG-769	Terrain Mapping and Modeling	3(2-1)
RSG-770	Land Information System	3(3-0)
RSG-771	Forest Management	3(3-0)

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

The assessment of curriculum is given in the following table and the courses are cross tabulated according to the program outcomes.

Table 7: Courses versus program objectives

Courses	Program objectives		
	1	**2**	**3**
RSG-701 Introduction to GIS and Spatial Analysis	+++	+++	+
RSG-702 Introduction to Remote Sensing and DIP	+++	+++	+
RSG-703 Introduction to GIS Database and Programming	+++	+++	+
RSG-704* Prescribed Mathematics Course	+	+	
RSG-705 Advanced Remote Sensing and DIP	++++	++++	++
RSG-706 Advanced Geographic Information Systems	++++	++++	++
RSG-707 Spatial Data Warehouse and Mining	+++	+++	++
RSG-708 Advanced Research Methods	+	+	+
RSG-711 Applied Remote Sensing and GIS	++++	++++	++++
RSG-712 Statistical Data Analysis	++	++	++
RSG-713 Geospatial Data Modeling	+	+++	+++

+ = Relevant, ++ = Relevant & satisfactory, +++ = Very relevant & Very satisfactory, ++++ = Highly relevant & Highly satisfactory, NA= Not applicable

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

The courses taught here is the blend of theoretical and practical knowledge. Moreover, the subject practical and intellectual skills are also evaluated through term projects.

Table 8: Content wise grouping of core courses

Elements	Courses
Theoretical Background	RSG-701, RSG-703, RSG-702, RSG-705, RSG-706
Problem Analysis	RSG-705, RSG-706, RSG-707, RSG-711, RSG-713
Solution Design	RSG-705, RSG-706, RSG-707, RSG-711, RSG-713, RSG-712, RSG-726, RSG-732, RSG-708,

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

The curriculum is designed to meet the international educational standards as well as the HEC requirements.

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

The curriculum also satisfy well the general and professional as well as other discipline requirements for the programme according to the demands and requirements set by HEC.

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.

The courses offered by the department of Geo-Informatics for PhD in Remote Sensing & GIS are the core courses for the requirements of PhD degree in Remote Sensing & GIS. These courses also satisfied the general requirements for gaining knowledge and skills in the fields of applied remote sensing and GIS.

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

Information Technology (IT) is the integral component of the PhD programme as the students have to acquaint with the relevant softwares along with programming skills for customization of GIS & RS applications.

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

Assignments are given to students on specific titles (part of the course) which are presented orally and are submitted as written report, to increase their oral and written communication skills. Moreover, research projects are also an integral component of almost all PhD courses which not only improve the GIS & RS skills of PhD scholars but also enhance the scientific writing skills.

3. CRITERION 3: LABORATORIES AND COMPUTING FACILITIES

The information about the laboratories at department of Geo-Informatics is as under.

Location and Area:

GIS and computing lab of the department is located in Faculty of Agricultural Engineering & Technology, Main Campus, PMAS-AAUR.

Objectives:

Laboratories are used for practical exercises and demonstrations to the students in their introductory and major courses.

Adequacy for instruction:

Course instructors demonstrate practical exercises. These laboratories are satisfactorily to some extent for meeting the courses requirements. Yet being a field closely related to information technology and as a requirement for various courses provision of internet in labs is also part of our future plans.

Software available:

ArcGIS Suite, ERDAS IMAGINE, ENVI, ECOGNITION DEVELOPER are installed in labs.

4. CRITERION 4: STUDENT SUPPORT AND ADVISING

The university organizes support programs for students and provide information regarding admission, scholarship schemes etc. Director Students Affairs also arranges various cultural activities and solve the students' problems. However, there is no parent's association at university level. The Students Resource Center also advises students about future planning and job placement.

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

Courses are taught as per criteria of HEC & international standards in the field of remote sensing and GIS. At doctorate level subjects/courses are offered as per scheme of study provided by the HEC and approved by University Academic Council. Elective courses are also offered as per policy of HEC and the University.

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

Courses are structured and decided in the departmental and then in faculty board of studies meetings. To ensure effective interaction between students and faculty, at the time of course formulation both theoretical and practical aspects are focused. Students are welcomed to ask question in class and even after the class. Theoretical problems are explained and assignments are also given to the students, whereas practical are carried out in the laboratory with the involvement of instructor directly.

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

Students are usually informed about the program requirement through the office of the head of the department. However, advising and counseling is also available through the personal

communication of the teachers with the students. In addition, students can also contact with the relevant teachers whenever they face any problem.

Students can interact with the teachers/scientist in universities or research organization whenever they needed and there is an open option for the students to get the membership in the professional societies. Students Recourse Centre has been established for exploring job opportunities for the university graduates.

5. CRITERION 5: PROCESS CONTROL

It includes student admission, students' registration, faculty recruitment activities, which are dealt by various statutory bodies and the university administration.

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.

The admission criterion for PhD in Remote Sensing & GIS degree program is well established and approved by the University Academic Council and Syndicate. An admission advertisement is published in the national newspapers by the Registrar Office.

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.

The student name, after completion of the admission process, is forwarded to the Registrar Office for proper registration and the registration number is issued to the student. Students are evaluated through Mid, Final and Practical examinations and through assignments, surprise quizzes and semester projects.

Registration is done for one time for each degree but evaluation is done through the result of each semester. Only those students, who fulfill the criteria, as notified by the Controllers of Examinations of the University, are promoted to the next semester.

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.

Recruitment policy followed by the University is recommended by the HEC. Faculty recruitment for all posts is done as per rule. Vacant and newly created positions are advertised in the national newspapers, applications are received by the Registrar office, and call letters are

issued to the short-listed candidates on the basis of experience, qualification, publications and other qualities/activities as determined by the University. The candidates are interviewed by the University Selection Board and principal and alternate candidates are selected. Selection of candidates is approved by the Syndicate for issuing orders to join within a specified period. Induction of new candidates depends upon the number of approved vacancies.

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.

Departments periodically review the curriculum depending upon new innovations and technology advancement as well as industry demands. Students usually buy cheap Asian editions of technology books. These books are also available in the University library, where documentation, copying and internet facilities are available. Photocopy material (book chapters, recent research papers) are also given to the students. Most of the lectures are supplemented by multimedia presentations. All efforts are made that the courses and knowledge imparted meet the objectives and outcome. The progress is regularly reviewed in the staff meetings and through university quality control cell.

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 controller of examinations announces the dates of commencement of examination. After each semester, the controller office notifies the results of the students. The evaluation procedure consists of quizzes, mid, final and practical examinations, assignments and reports, oral and technical presentations. Weightage of each component i.e. theory, practical and assignments is maintained through Campus Management System CMS.

6. CRITERION 6: FACULTY

Standard 6-1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The interest and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline.

The full time faculty distribution by program areas is given in the Table 3. The faculty resume are attached as Annexure-I.

Table 10: Research are wise faculty distribution

Program area of specialization	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with Ph.D. degree
Applied Remote Sensing	08	01	01
Applied GIS, Web GIS	07	01	01
Food Security, Climate Chnage	05	01	01

Standard 6-2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place. Effective Programs for Faculty Development

Professional training and availability of adequate research and academic facilities are provided to the faculty members according to the available resources. Incentives in the form of allowances to theses supervisors have been implemented to promote high standard research.

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

Motivation and appreciation by the senior faculty members provides enthusiasm to the young faculty members. Factors for motivation and satisfaction for faculty were facilitation, cooperation and compensation by colleagues; independence for office duties and research work; job security and pay package. Faculty members were given full independence in conducting research and co-curricular activities. Most of the faculty members were satisfied in term of research, teaching, interaction with student salary and compensation package.

7. CRITERION 7: INSTITUTIONAL FACILITIES

According to this criterion, the institution must have the infrastructure to support new trends in learning such as e-learning including digital publications, journals etc. The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.

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

The faculty and students have access to E-library through university internet facility in the central library which is very helpful for the high quality education and producing research of international standard. Unfortunately, internet facility in faculty offices is lacking which hinders the process of learning and development.

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.

The department of Geo-Informatics is establishing its own library with appreciable number of books related to Geo-Informatics. The University Central Library is requested to provide sufficient books on the subject. Currently, few books are available in the central library on the subject.

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

Currently there are three main class rooms for teaching Geo-Informatics courses. However, after the construction of new building more class rooms and faculty offices will be available. Three multimedia and laptops are available for the lecture halls/laboratories.

8. CRITERION 8: INSTITUTIONAL SUPPORT

The university administration has been struggling hard to strengthen and upgrade all the departments and establishing new faculties and Institutes. The university is also trying to attract highly qualified faculty.

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.

At present the budget requirements of the faculty are met through the project approved by Planning & Development Department, Pakistan. There is an allocation of budget for the purchase of laboratory equipment and chemicals & glassware in the PC-1.

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

The intake of PhD Remote Sensing & GIS students is twice in a year. A detail of the students input during the past years is given below.

Table 11: Year wise intake of PhD students

DESCIPLINE	2013-2014	2014-2015
PhD RS & GIS	05	05

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

There is an allocation of budget for the purchase of laboratory equipments, softwares through different project funded by Planning & Development Department, Pakistan.

SUMMARY & CONCLUSIONS

The department of Geo-Informatics is offering degrees of MS and PhD in the fields of Remote Sensing and GIS at postgraduate level. The department focuses teaching and research in the areas of natural resource management, hazards and disaster management, water resource management and land use land cover changes. The program mission corresponds well with the objectives of the program. There were different criteria to assess the program objectives with the institutional framework. The self-assessment report of the degree programs prepared by the department of Geo-Informatics attempts to reflect the level of fulfilling the criteria devised by HEC for the award of degree programs.

The quantitative assessment of the department for the period from 2013-2015 is impressive in various categories of the degree programs thus fulfilling the HEC criteria. Each faculty member has been evaluated in terms of teaching, research output and satisfaction level depicted by students.

Teaching load among faculty members is variable and justified as per HEC standard. Average intake of PhD students by the department scores around 5 annually. 9 PhD students are currently involved in the research. The faculty members use a variety of appropriate instructional techniques, dialogues and interactive discussions for dissemination of knowledge.

Curriculum contents of the program are compatible with contemporary emerging and changing needs. The curriculum is revised regularly in the light of HEC and international requirements. Textbooks and reference materials are available in the central library. However, these facilities are inadequate to cater the needs of the students. In this regard, the departmental library is being established with updated books and material. Course evaluation system is quite

effective and is being efficiently utilized by the department for quality assessment. The results of the assessment are aptly reflected in this report.

Course files are regularly and properly maintained and submitted to QEC for timely appraisal and record. Moreover, record is indicative of the meetings regularly held by the faculty board.

Laboratory setup is weak and needs to be strengthened gradually. However, lab will be improved and separate cubes will be allocated to students with dedicated internet connection. The lab supporting staff for adequately and timely instructions/supervision and guidance is lacking. There should be a centralized access to study support material/lectures/assignments etc. State of the art software/equipment is required to be purchased and made available for well-equipped laboratory.

The department computing infrastructure and facilities needs to be improved for the faculty members and PhD students. The ground breaking ceremony for the construction of new academic block for the faculty was held which will improve the infrastructure of the department. New building will have sufficient space for class rooms, library, seminar hall and laboratories. Internet facilities are insufficient for the faculty. However, these are planned and soon will be implemented.

Students are engaged in classes through presentations, class projects and interactive sessions which tend to provide friendly learning environment. The interaction of the students with teaching staff is encouraging and getting stronger day by day. The average CGPA of the students is around 3.5.

Since its inception in 2013, the department of Geo-Informatics has been making continuous progress in terms of class room based skills and knowledge pertaining to use of geospatial technologies in solving real world issues through simulation and modeling of real world

phenomenon, as well as practical application of these tools in various fields of research ranging from conservation and management of natural resources, geological studies, to wildfire habitat and later recourse management, over these years the department has advanced remarkably and has made notable contribution in the areas of curricula development, research metrology and dissertation of knowledge associated with geo spatial technologies. The registered PhD students are working on the themes that have been selected while keeping the real world issues in mind and their work will make a substantial contribution in the research areas covered by Geo-Informatics. The current research studies of PhD students focus at Biomass/ Carbon stock estimation, yield estimation, and water resources management. The selected area of research will prove to be very beneficial for government departments, private organizations and societal applications. Latest evolved and improved methodologies are being employed in PhD studies that have global level acceptability and likely to produce reliable and trust worthy information.

Further research studies would address natural hazards, ground water system studies, application of Synthetic Aperture Radar (SAR) and Light Detection and Ranging (LIDAR) technologies in 3D modeling, development of web based applications and services, detailed topographic analysis Air quality monitoring and regional and urban planning.

It is stated that the program is running successfully. However, room for improvement in every aspect of the program is always there. Owing to success and importance of the program, continuation of this program is highly recommended.

ANNEXURE

Annexure I

Proforma 2 Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-701	Title	Intro to GIS and Spatial Analysis		
Session	2013	Semester	**Autumn**	Spring	Summer
Credit Value:	3(2-1)	Level: Post-Graduate	Prerequisites: NIL		
Name of Course Instructor: **Dr. Mobushir Riaz Khan**	No. of Students: 5	Lectures Theory: 30	Other (Please State)		
	Contact Hours: 04	Lectures Practical: 15	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	05	60	40						05

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

1) Student (Course Evaluation) Questionnaires More Than 80 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

Proforma 2 Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-702	Title	Intro to RS & DIP		
Session	2013	Semester	**Autumn**	Spring	Summer
Credit Value:	3(2-1)	Level: Post Graduate	Prerequisites:		
Name of Course Instructor: **Dr. Mobushir Riaz Khan**	No. of Students: 02	Lectures Theory: 30	Other (Please State)		
	Contact Hours: 15	Lectures Practical: 15	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	02		100						02

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

1) Student (Course Evaluation) Questionnaires
More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.

2) External Examiners or Moderators (if any)

3) Student /staff Consultative Committee (SSCC) or equivalent, (if any)

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

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

6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.

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

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

Proforma 2: Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-703	Title	Intro to GIS Databases & Programming		
Session	2013	Semester	**Autumn**	Spring	Summer
Credit Value:	3(2-1)	Level: PhD	Prerequisites:		
Name of Course Instructor: Mr. Muhammad Amin	No. of Students: 01	Lectures Theory: 45	Other (Please State)		
	Contact Hours: 15	Lectures Practical:	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	01		100						01

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

1) Student (Course Evaluation) Questionnaires More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

PMAS-Arid Agriculture University Rawalpindi

Faculty of Agricultural Engineering & Technology

Department of Geo-Informatics

Proforma 2 Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-701	Title	Intro to GIS and Spatial Analysis		
Session	2014	Semester	Autumn	**Spring**	Summer
Credit Value:	3(2-1)	Level: Post-Graduate	Prerequisites: NIL		
Name of Course Instructor: **Dr. Mobushir Riaz Khan**	No. of Students: 5	Lectures Theory: 30	Other (Please State)		
	Contact Hours: 04	Lectures Practical: 15	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	05	60	40						05

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

1) Student (Course Evaluation) Questionnaires More Than 80 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____

(Course Instructor)

Name: _____ Date: _____

(Head of Department)

Proforma 2 Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-705	Title	Advanced RS & DIP		
Session	2014	Semester	Autumn	**Spring**	Summer
Credit Value:	3(2-1)	Level: Post Graduate	Prerequisites:		
Name of Course Instructor: **Dr. Mobushir Riaz Khan**	No. of Students: 05	Lectures Theory: 30	Other (Please State)		
	Contact Hours: 15	Lectures Practical: 15	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	05	80	20						05

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

1) Student (Course Evaluation) Questionnaires
More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.

2) External Examiners or Moderators (if any)

3) Student /staff Consultative Committee (SSCC) or equivalent, (if any)

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

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

6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.

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

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

Proforma 2: Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-706	Title	Intro to GIS Databases & Programming		
Session	2014	Semester	Autumn	**Spring**	Summer
Credit Value:	3(2-1)	Level: PhD	Prerequisites:		
Name of Course Instructor: Dr. Siddiqullah Baig	No. of Students: 07	Lectures Theory: 45	Other (Please State)		
	Contact Hours: 15	Lectures Practical:	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	07	14.28	85.71						07

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

1) Student (Course Evaluation) Questionnaires More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

Proforma 2: Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-717	Title	Prescribed Mathematics		
Session	2014	Semester	Autumn	**Spring**	Summer
Credit Value:	3(3-0)	Level: PhD	Prerequisites:		
Name of Course Instructor: Dr. Mobushir Riaz khan	No. of Students: 06	Lectures Theory: 45	Other (Please State)		
	Contact Hours: 15	Lectures Practical:	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	02	100							06

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

1) Student (Course Evaluation) Questionnaires More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

PMAS-Arid Agriculture University Rawalpindi

Faculty of Agricultural Engineering & Technology

Department of Geo-Informatics

Proforma 2: Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-708	Title	Advanced Research Methods		
Session	2014	Semester	**Autumn**	Spring	Summer
Credit Value:	3(3-0)	Level: Ph.D.	Prerequisites:		
Name of Course Instructor: Dr. Mobushir Riaz khan	No. of Students: 02	Lectures Theory: 45	Other (Please State)		
	Contact Hours: 15	Lectures Practical:	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	02		100						02

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

1) Student (Course Evaluation) Questionnaires More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____

(Course Instructor)

Name: _____ Date: _____

(Head of Department)

Proforma 2: Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-711	Title	Applied Remote Sensing & GIS		
Session	2014	Semester	**Autumn**	Spring	Summer
Credit Value:	3(3-0)	Level: MS	Prerequisites:		
Name of Course Instructor: Dr. Mobushir Riaz khan	No. of Students: 05	Lectures Theory: 30	Other (Please State)		
	Contact Hours: 15	Lectures Practical: 15	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	05	40	60						05

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

1) Student (Course Evaluation) Questionnaires More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

Proforma 2: Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-751	Title	Climate Change		
Session	2014	Semester	**Autumn**	Spring	Summer
Credit Value:	3(3-0)	Level: PhD	Prerequisites:		
Name of Course Instructor: Dr. Mobushir Riaz khan	No. of Students: 02	Lectures Theory: 45	Other (Please State)		
	Contact Hours: 15	Lectures Practical:	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	02	50	50						02

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

1) Student (Course Evaluation) Questionnaires More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

Proforma 2: Faculty Course Review Report

Department	Geo-Informatics	Faculty	Agricultural Engineering & Technology		
Course Code	RSG-751	Title	Climate Change		
Session	2015	Semester	Autumn	**Spring**	Summer
Credit Value:	3(3-0)	Level: PhD	Prerequisites:		
Name of Course Instructor: Dr. Mobushir Riaz khan	No. of Students: 02	Lectures Theory: 45	Other (Please State)		
	Contact Hours: 15	Lectures Practical:	Seminars		
Practical assignments and projects were given for evaluation in addition to mid and final term exams.					

Distribution of Grade/Marks and other Outcomes:

Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	%Grade D	%Grade F	No Grade	With-drawl	Total
No. of Students	02	100							02

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

1) Student (Course Evaluation) Questionnaires More Than 90 % of the students who enrolled in the course were satisfied both with the instructor and course contents.
2) External Examiners or Moderators (if any).
3) Student /staff Consultative Committee (SSCC) or equivalent, (if any).
4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines. The course is in compliance with the HEC guidelines.
5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports.
7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt.

Name: _____ Date: _____
(Course Instructor)

Name: _____ Date: _____
(Head of Department)

Annexure II

Faculty Resumes

Name	**Dr. Mobushir Riaz Khan**
Personal	Telephone: 0092 300 8305334 E-Mail: mobushir_riaz@yahoo.com; Web site: http://www.mriazkhan.com
	Ph.D. Applied Remote Sensing and GIS
Experience (16 Years)	Remote sensing and GIS Development expert **PMAS University of Arid Agriculture, Rawalpindi Jan 2014 till now.** **Director University Institute of Information Technology** Managing the Institute with more than 2000 students in 6 teaching and research programs in both morning and evening sessions. Responsibilities include providing conducive learning environment to promote high quality Computer Science and Information Technology education to produce dedicated, hardworking and learned graduates. **Associate Professor, Geo-Informatics** Successfully launched the department of Geo-Informatics in the Faculty of Agricultural Engineering and Technology (AE&T). Developed and started the programs of MS and Ph.D. in Remote Sensing and GIS. Responsible for teaching and undertaking multiple research activities both independently as well as with local and international collaborations. Supervising Students and development of degree programs.
	Cardiff University, United Kingdom July 2013 till September 2013 **Visiting Researcher, Department of Computer Science and Informatics** For research and joint project formulation and building research collaborations
	Institute of Space Technology (IST), Islamabad March 2013 till January 2014 **Associate Professor, Department of Space Science** Responsible for teaching and undertaking multiple research activities both independently as well as with local and international collaborations. Supervising Students and development of degree programs. Instrumental in starting MS Remote Sensing and GIS program at IST.
	COMSATS Institute of Information Technology, Islamabad May 2011 till March 2013 **Assistant Professor, Department of Meteorology** Responsible for teaching and undertaking multiple research activities both independently as well as with local and international collaborations. Have been teaching courses at PhD and MS/MPhil level. -Additionally, worked as In-charge MS program Remote Sensing and GIS. - Designed the program of BS Geo-Informatics with the help of junior faculty members and defended in Board of Studies. The program is academically approved. - Designed the program of MS Geo-Informatics for Disaster Management with the help of junior faculty members and presented to HOD for onward submission to Chairperson for meeting of BOS. - Designed the program of MS Global Warming and Climate Change with the help of junior faculty members and defended in Board of Studies. - Secretary Organizing Committee for International Workshop on climate

	change and sustainable management of water resources in the Asia Pacific Region November 22-24, Islamabad. - Main Resource Person for the International Training Workshop on Use of Information Technology in Irrigation Management for Small Scale Farming Communities in Rural Areas. The Workshop is tentatively scheduled to be held from 25 - 27 December 2012 at Islamabad, Pakistan organized by CIIT, INIT and ISESCO. - MS and Ph.D. student Supervision (MS 09 and Ph.D. 02)
	Assistant Professor , PMAS University of Arid Agriculture Rawalpindi Jan 2008 - May 2011 Was responsible for teaching and undertook multiple research activities both independently as well as with local and international collaborations. Taught a number of courses at PhD and M.Sc. (Hons.) and Ph.D. level.
Journal Publications	1. **Khan, M.,** Ahmed, H., Panadero-Fontan, R., Lopez-Sandez, C., Khan, M., Asif, S., Mustafa, I., Ali, M., Raza, H., & Qayyum, M. (2015). Risk mapping of bovine hypodermosis using geographical information system (GIS) in cattle of subtropical region, Pakistan. The Journal Of Infection In Developing Countries, 9(08), 872-877. doi:10.3855/jidc.5387 2. S. Hasson, V. Lucarini**, M. R. Khan**, M. Petitta, T. Bolch, and G. Gioli. (2013) Early 21st century climatology of snow cover for the western river basins of the Indus River System. **Hydrol. Earth Syst. Sci. Discuss., 10, 13145-13190, 2014 (IF JOURNAL)** 3. Arshad M, Ahmed N, Mustafa I, **Khan M R,** Ahmed H." Avifauna Studies in Co-Relation with Alteration in Climatic Patterns and Hydrology of Uchalli Lake, Punjab, Pakistan". **Pakistan J. Zool., vol. 46(2), pp. 0-0, 2014 (PJZ-1583-13) 2014. ISI Indexed, NATIONAL (Impact factor: 0.333).** 4. **Khan, M.R.,** de Bie, C.A.J.M., van Keulen, H., Smaling, E.M.A. and Real, R. (2010) Disaggregating and mapping crop statistics using hypertemporal remote sensing. **International Journal of Applied Earth Observation and Geoinformation 12, 36-46. (IF JOURNAL)** 5. Ahmed, H., **Khan, M. R**., Fontan, R. P.Sandez C. L., Iqbal, M. F., Naqvi, S. M. S. and Qayyum, M.(2012) Geographical Distribution of Hypodermosis (Hypoderma sp.) in Northern Punjab, Pakistan, **Kafkas Univ. Vet. Fak. Derg. 18: A215-1219, 2012. (IF Journal).** 6. de Bie, C.A.J.M., **Khan, M.R.,** Smakhtin, V.U., Venus, V., Weir, M.J.C. and Smaling, E.M.A. (2011). Analysis of multi temporal NDVI SPOT images for small scale land use mapping. **International Journal of Remote Sensing, 32 (2011)21 pp. 6673-6693. (IF JOURNAL)** 7. Naeem M., F. Shahzad and **M. R. Khan,** (2005) Biosytematics of Aphid Parasitoids (Hymenoptera: Aphidiidae) from Potohar Region of the Punjab (Pakistan). **Entomologists Monthly Magazine 141:219-226 London. (INDEXED, HEC RECOGNIZED)**

8. Bodlah, I, M. A. Bodlah, T. Akhtar, M. Naeem and **M. R. Khan**., (2011) Record of Delta dimidiatipenne in space and time (de Saussure, 1852) (Hymenoptera: Eumininae, Vespidae) from Barani areas of Punjab Province of Pakistan. **Pakistan Journal of Zoology. 43(5).1019-1020. (IF JOURNAL)**

9. Khaliq A., **M. R. Khan**., Khan L., (2003) Incidence of Infestation and Parasitization of Codling Moth, Cydia pomonella (L.), in Murree Hills (Punjab). **Pak Entomol. 25: 69-72. (INDEXED, HEC RECOGNIZED)**

10. Bodlah I., Naeem, M., **Khan, M. R.**, Bodlah M. A., and Akhter T., (2012) Genus Delta De Saussure (Hymenoptera: Eumininae, Vespidae) from Punjab Province of Pakistan. **Pakistan Journal of Zoology. 44 (3). 759-7644. (IF JOURNAL)**

11. Mustafa, I., Raza, A., Arshad, M., Ahmed, H., **Khan, M. R.,** and Ahmad, I., (2013) Correlation of Citrus Leaf Miner (Phyllocnistis citrella Stainton) with Snail Population in District Sargodha Punjab, Pakistan, **Pakistan Journal of Zoology, vol. 45(2), pp.** 453-458**, 2013 (PJZ-1158-12). (IF JOURNAL)**

12. Iqbal, M. F., Khan, M.R., and Malik, A.H. (2012) Land Use Change Detection in the Limestone Exploitation area of Margalla Hills National Park (MHNP), Islamabad, Pakistan using Geo-spatial techniques, **Journal of Himalayan Earth Sciences,** V**olume 46 (1), (INDEXED, HEC RECOGNIZED)**

13. Ahmed H, **Khan M R**, Panadero-fontan R, Sandez C L, Mustafa I, Ghani A, Hussain M, Asif S, Ahmad A , Naqvi SMS, Qayyum M. Prevalence of Bovine Hypodermosis in Water Buffalo (*Bubalus bubalis*) from Jhelum District, Pakistan. *Kafkas Univ. Vet. Fak.. Derg.* 19 (1): 79-84, **2013, ISI Indexed, INTERNATIONAL (*Impact factor*). DOI: 10.9775/kvfd.2012.7227**

14. Ahmed H, **Khan M. R**, Panadero-fontan R, Sandez C L, Qayyum M. Development of Indirect ELISA for the Diagnosis of Bovine Hypodermosis (*Hypoderma lineatum*) in the Cattle of Subtropical Region of Pakistan. *Kafkas Univ. Vet. Fak. Derg.* 19 (6), 1017-1022, **2013, ISI Indexed, INTERNATIONAL (*Impact factor*: 0.495). DOI: 10.9775/kvfd.2013.9348**

15. Ahmed H, **Khan M R**, Panadero-fontan R, Sandez C L, Qayyum M. Influence of epidemiological factors on the prevalence and intensity of Hypoderma sp. in cattle of Potowar Region, Pakistan. **(Pak. J. Zoo). Pakistan J. Zool., vol. 45(6), pp. 1495-1500. 2013 ISI Indexed, NATIONAL (Impact factor: 0.333).**

16. Mustafa I, Raza ABM, Arshad M, Ghani A, **Khan M R** Ahmed H. Population Dynamics of Citrus Leaf Miner (CLM) (Phyllocnistis citrella: Stainton) on Different Species of Citrus in Correlation with Abiotic Environmental Factors in District Sargodha Punjab Pakistan**. (Phytoparastica). 2013, ISI Indexed, INTERNATIONAL (Impact factor: 0.80). DOI: 10.1007/s12600-013-0365-2**

17. Arshad M, Siddique F, Ahmed S, Mustafa I, Anwar P, Asif S, **Khan M. R**. Ahmed H. An epidemiological study on prevalence of Goat Warble Fly Infestation (GWFI) in Punjab Province, Pakistan. **Kafkas Univ. Vet. Fak. Derg. 20 (1): 35-40, 2014, ISI Indexed, INTERNATIONAL (Impact factor: 0.495). DOI: 10.9775/kvfd.2013.9402**

18. **Khan, M.R.,** de Bie, C.A.J.M., van Keulen, H., Smaling, E.M.A. and Real, R. (2013) Integrating soil maps in a model to map crop areas using hypertemporal remote sensing and crop statistics. **Revised and Resubmitted in International Journal of Applied Earth Observation and Geoinformation. (IF JOURNAL)**

19. Mustafa I, Saman, Asif S, **Khan M R,** Ahmed H.". "Association of citrus leaf miner with leaf biochemical factors (Ca+2, K+ and Mg+2) in kinnow leaves of district Sargodha, Punjab Pakistan". (Pak. J. Zoo). Accepted. In Press. 2014. ISI Indexed, NATIONAL (Impact factor: 0.333).

20. Mustafa I, Kamran R, **Khan M R,** Ahmed N, Ahmed H." Comparative metal profile in different organs of House Sparrow (Passer domesticus) and Black kite (Milvus migrans) in Sargodha district, Punjab Pakistan. Pak. J. Zoo, vol. 47(4), pp. 1103-1108, 2015, NATIONAL (IF: 0.40).

21. Arshad M, Ahmed N, Ghani A, **Khan M R** Mustafa I, Ahmed H." Population Dynamics of House Sparrow (Passer domesticus) and House Crow (Corvus splendens) in Punjab (District Sargodha), Pakistan. Pak. J. Zool l. 47(4), pp. 1147-1155, 2015. ISI Indexed, NATIONAL (IF: 0.40).

22. Mustafa I, Abrar M, Waheed M, Ahmed H, **Khan M R,** Panadero-fontan R, Sandez C L, Farooq M, Naqvi SMS, Qayyum M. "Newcastle disease as an emerging disease in Peacock of Tharparkar region of Pakistan. Journal of Infection in Developing Countries (JIDC). Accepted. In Press. xx(x), pp. xxx-xxx, 2015. DOI: 10.3855/jidc.5258 ISI Indexed, INTERNATIONAL (Impact factor: 1.30).

23. Mustafa I. Shahbaz M. Asif S, **Khan MR,** Saeed U, Sadiq F, Mehmood T, Ahmed H, Simsek S. Prevalence & characterization of Hydatidosis (Echinococcus granulosus) isolates in different organs of ruminants (Cattles, Sheeps, Goat) in Central Punjab, Pakistan. Kafkas Univ. Vet. Fak. Derg Accepted. In Press. xx(x), pp. xxx-xxx, 2015. ISI Indexed, INTERNATIONAL (IF: 0.26). DOI: 10.9775/kvfd.2015.13755

More research papers on **Remote Sensing and GIS applications and Climate Change Impact Assessment** are also in the status of submission and preparation.

Keynote/professional Presentations	**1.** Resource person for Training on Farm Water Management for Baluchistan Farmers' & Agriculture Staff **jointly organized by FAO and PMAS-AAUR, Pakistan January 16-25, 2014** **2.** Remote Sensing and GIS based analyses for identification of potential rainwater harvesting sites, Presentation delivered to **Minister Food Security and Research, Delegates from Agricultural research organizations and faculty members September 27, 2013 at Koont Research Farms, PMAS-Arid Agriculture University, Rawalpindi.** **3.** Invited speaker on Rehabilitation of livelihood of Earthquake hit areas of Awaran, Baluchistan in September, 2013 **at Ministry of defense** **4.** Main Resource Person for **the International Training Workshop on Use of Information Technology in Irrigation Management for Small Scale Farming Communities in Rural Areas. The Workshop is tentatively scheduled to be held from 25 - 27 December 2012 at Islamabad, Pakistan organized by CIIT, INIT and ISESCO.** Following presentations were made: a. Information Technology and the irrigation management b. Agro-meteorology and its role in irrigation management and crop production c. Developing web based decision support systems d. Mapping and Monitoring of small scale agricultural land use systems using Information extracted from Satellites e. Hands on Training of "Remote Sensing Image Analysis Mapping and Monitoring of small scale agricultural land use systems with special focus on water management" **5.** Resource person for **International Workshop on "Adaptation to Natural Hazards in Changing Global Climate Scenario"** and presented Food Security with Remote Sensing in the Wake of Changing climates: Towards a Decision Support System for Policy Makers. 25-27th September, 2012 COMSTECH Building, 33 Constitution Avenue, G-5/2, Islamabad Organized by: NCEG, Peshawar-COMSTECH, Islamabad Monitoring. **6. Resource person for Inter Islamic Network on Space Sciences and Technology ISNET/CSE Workshop on Applications of Space Technology for Food Security**; 9-14 July 2012 (Training Workshop 11-14 July 2012); Dakar, Senegal. Following presentations were made: a. Remote Sensing based Food Security Assessments b. Hyper-temporal Remote Sensing based Image Analysis for Crop Monitoring c. Hands on Training of "Hyper-temporal Remote Sensing Image Analysis for Crop Monitoring d. Remote Sensing and Statistical Analysis of Specific Crop Area Mapping e. Hands on Training of "Remote Sensing and Statistical Analysis of Specific Crop Area Mapping f. Crop Production Estimation and Crop Growth Algorithms **7.** Remote Sensing and GIS based food security system and climate change impact assessment and mitigation for Pakistan , **March 16-21, 2012 (Bhurban) Food Security in Pakistan: Future Challenges and Coping Strategies Jointly organized by National Ministry of Food Security and Research, FAO, WFP and National NGO'S** **After this national workshop, the Food Security Policy was announced in the presence of Prime Minister of Pakistan.** **8.** Remote Sensing and GIS based sustainable water resource management and

	food security in Pakistan, **March 22, 2012 Jointly organized by COMSATS Institute of Information Technology & UNESCO – Islamabad** **9.** Remote Sensing and GIS based analysis agricultural land use mapping in perspective of climate change, Training Course on "**Understanding Natural Resources and Climate Change using Geospatial Techniques" March 12 - 16, 2012, Institute of Space Technology, SUPARCO and Leads International** **10.** Resource person for **ICIMOD, Nepal's Training in Pakistan on the role of remote sensing and GIS for climate change** **11.** Presentation to Ph.D. students at the **Faculty of GeoInformation and Earth Observation, University of Twente during Ph.D. weekend (2010, Germany) on Efficiently Managing Ph.D. Studies** **12.** Quantitative mapping and monitoring of crop production systems. Presented to the scientific community on **ITC Ph.D. day. The Netherlands** **13.** Estimation of crop production by using crop growth modeling and remote sensing inputs in the models for accurate estimation. **Presented to the head and members of statistics department of Ministry of agriculture and fisheries, Andalucia, Spain** **14.** Impact of Climate Change on Water Resources and food security in Pakistan (together with Prof. Dr. Badar Ghauri, HOD, RS&GIS, IST, Karachi) at **Pak-China Business Forum April, 15-18, 2012**.
Research Projects	**1. Dengue monitoring system development using RS, GIS and Web development** **2. DSS for irrigation management using remote sensing and GIS** 3. **RESEARCH FOR AGRICULTURAL DEVELOPMENT PROGRAM (RADP) of PAKISTAN AGRICULTURAL RESEARCH COUNCIL (PARC) Project**. Title: Site Selection of rain water harvesting through GIS and Remote Sensing Technology for hilly areas of D.G. Khan and Rajanpur Districts. (cost: 3.0 million PKR; Status: Approved and ongoing) (Investigator) 4. Rain water harvesting project for all villages in Potohar area **by Agency For Barani Areas Development, (Abad)** Twenty sites have been completed and 200 sites will be conducted afterwards 5. Remote Sensing and GIS based **risk assessment in the northern areas under command of FCNA for Pakistan Army. (Team leader)** 6. Costal Communities and Climate Change: Case study of Thatta and Badin Districts. (Team leader). **Funding Agency: Asian Development Bank**) 7. Remote Sensing based natural resource mapping of Chagai District, Baluchistan, Pakistan **(Funding agency: Quantum Energy) Principal Investigator** 8. "Biosystematics of dragonflies (Odonata) of Pakistan" (1405560 Rs.) by **Higher Education Commission of Pakistan (HEC)** (1-1-2005-30-09-2008) 9. Remote sensing and GIS based mapping and monitoring of agricultural land use of Pakistan **(In review at PARC, cost PKR 6.5 Million)**

2:

<table>
<tr><td>Name</td><td>Dr. Muhammad Naveed Tahir</td></tr>
<tr><td>Personal</td><td>Permanent Address House # 10, Lala Zar Colony, Sahiwal, Pakistan Contact No. 0092-300- 6917208
E-mail: naveed@uaar.edu.pk Alternate E-mail naveednwsuaf@gmail.com</td></tr>
<tr><td>EXPERIENCE</td><td>Presently working as a regular Assistant Professor since 30th June, 2014, Department of Agronomy, PMAS-Arid Agriculture University Rawalpindi

Lecturer since 21st December 2004 to 29th June 2014, Department of Agronomy, PMAS-Arid Agriculture University Rawalpindi</td></tr>
<tr><td>RESEARCH ACTIVITIES</td><td><u>List of Projects On-going / submitted for financial assistance</u>
<table>
<tr><th>Sr. No.</th><th>PI / Co-PI</th><th>Title of the project</th><th>Amount (millions Rupees)</th><th>Funding Agency</th><th>Status</th></tr>
<tr><td><u>1</u></td><td>PI-Dr. Shahzada Sohail Co-PI- Dr. Muhammad Naveed Tahir</td><td>Inter-Comparison of Century and DSSAT Model Simulations to improve Soil Based Climate Change Resilience and Adaptation of Rainfed Crop Production System in Pakistan</td><td>3.5167</td><td>Higher Education Commission, Pakistan</td><td>On-going</td></tr>
<tr><td><u>2</u></td><td>PI- Dr. Muhammad Naveed Tahir C0-PI- Prof. Dr Gerrit Hoogenboom, Dr. Syed Aftab Wajid, Dr. Ghulam Rasool</td><td>Modelling approach for assessing the impact of climate change on growth and yield of wheat and groundnut and possible adaptation/management strategies under rainfed condition</td><td>4.47</td><td>(United State-PAK, Center for Advance Studies, Agriculture Food Security</td><td>In Review</td></tr>
<tr><td><u>3</u></td><td>PI- Dr. Muhammad Naveed Tahir C0-PI- Prof. Dr Yang Chenghai,</td><td>Evaluating the potential of time series LANDSAT 8 imagery for real time estimation of wheat chlorophyll contents under rainfed</td><td>3.513</td><td>(United State-PAK, Center for Advance Studies, Agriculture Food</td><td>In Review</td></tr>
</table></td></tr>
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	Dr. Jhanzaib Masood Ahmad Cheena, Dr Javed Iqbal	condition		Security	

List of Ph.D and M.Sc/MS Students as a Major supervisor

Sr. No.	Title	Degree	Remarks
1	**Remote Estimation of Wheat Chlorophyll Contents by using Satellite images**	**M.Sc (Hons.)** Agriculture/Agronomy	Completed (2015)
2	**Estimation of Wheat Yield by using Artificial Neural Networks**	**M.Sc (Hons.)** Agriculture/Agronomy	Completed (2015)
3	**Impact Assessment of Climate Change on Development and Yield of Newly Developed Wheat Cultivars: Future Scenario between 2040 and 2070**	**M.Sc (Hons.)** Agriculture/Agronomy	Completed (2015)
4	**Estimation of Wheat Yield based on DSSAT Model and Remote Sensing Data**	**Ph.D** Agriculture/Agronomy	In Progress
5	**Impact Assessment of Climate Change on Growth and Yield of Barley (*Hordeum vulgare* L.) Crop by using DSSAT Model**	**M.Sc (Hons.)** Agriculture/Agronomy	In Progress
6	**Determining Nitrogen Content in Wheat by using Fourier Transform Infrared Spectroscopy (FTIR)**	**M.Sc (Hons.)** Agriculture/Agronomy	In Progress
7	**Evaluating the potential of Weeds for biofuel production**	**M.Sc (Hons.)** Agriculture/Agronomy	In Progress

Published papers

1. Muhammad Naveed Tahir, Jun Li, Bingfeng Liu and Chengfeng Cui. **2015.** Hyperspectral remote estimation of leaf nitrogen content of summer corn based on red edge inflection point. Science International, 27 (2), 1689-1691. (ISI Indexed, HEC Recognized).

2. Muhammad Naveed Tahir, Wang Xue Chun, Li Jun and Hao Ming

	De. **2015.** Verification of soil moisture simulating accuracy on dry-land winter wheat and spring maize field by EPIC model on the loess plateau of China. International Journal of Biology and Biotechnology (ISI Indexed, HEC Recognized) **Accepted.** **3. Muhammad Naveed Tahir**, Jun Li, Bingfeng Liu and Chengfeng Cui. **2015**. Remote estimation of leaf total nitrogen by using derivative reflectance spectra and their parameters. Science International, 27 (2), 1691-1693. (ISI Indexed, HEC Recognized) **4.** Nasir Jamal, Muhammad Hanif, **Muhammad Naveed Tahir**, Muhammad Amjad and Asim Gulzar. **2015**. Comparative study of crop estimation techniques: a case study of District Bhakkar. International Journal of Biology and Biotechnology (ISI Indexed, HEC Recognized) **Accepted.** **5.** Muhammad Hanif, Muniba Tahir, **M. Naveed Tahir**, Nasir Jamal, Dr. Saima Mustafa, and Nasir Ali. **2015**. An evaluation of various forecasting methods for wheat supported prices through statistical techniques. Science International, 27 (2), 1681-1687. (ISI Indexed, HEC Recognized). **6.** Asim Gulzar, Mavia Hafeez, Kamran Yousaf, Majid Ali, Muhammad Tariq and **Muhammad Naveed Tahir. 2015.** Toxicity of some conventional insecticides against mango mealybugs, *Drosicha mangiferae* (Pseudococcidae; Hemiptera). Science International, 27 (2), 1693-1695. (ISI Indexed, HEC Recognized). **7. Muhammad Naveed Tahir**, Jun Li, Bingfeng Liu, Gangfeng Zhao, Fuqi Yao, Chengfeng Cui. **2013**. Hyperspectral estimation model for nitrogen contents of summer corn leaves under rainfed condition. Pakistan Journal of Botany, 45 (5): 1623-1630. (**Impact factor 1.21**). **8.** Wang X, C., J. Li. **M. Naveed Tahir**, M. Hao. **2012**. Sustainable recovery of soil desiccation after alfalfa (*Medicago sativa L.*) by grain crop rotation system in the semi-humid region on the Loess Plateau. Agriculture, Ecosystem and Environment, 161: 152– 160 (**Impact factor 3.94**). **9.** Liu Bingfeng, Li Jun, Zhao Gangfeng, **M. Naveed Tahir** and He Jia. **2012**. Total nitrogen contents estimation model of summer maize leaves using hyperspectral remote sensing. Plant nutrition and fertilizer science, 18 (14), 813-824 (In Chinese with English abstract). **10.** Zhao ganfeng, Li Jun, Liu Bingfeng, **M. Naveed Tahir**. **2012**. Monitoring model of leaf nitrogen contents of winter wheat in guanzhong district by hyperspectral remote sensing. Journal of triticeae crops, 32 (3): 530-536 (In Chinese with English Abstract). **11.** Wang X, C., **M. Naveed Tahir**, M. Hao and J. Li. **2011**. Sustainable recovery of soil desiccation in semi-humid region on the Loess plateau. Agricultural Water Management, 98: 1262-1270. (**Impact factor 2.64**). **12.** Wang Xuechun, Li Jun, Fang Xinyu, Sun Jian and **Muhammad Naveed Tahir**. **2011**. Simulation on the restoration effect of soil moisture in alfalfa (*Medicago sativa*) grain rotation system in semi-arid and drought prone regions of Loess Plateau. Chinese Journal of Applied Ecology, 22(1): 105-113. (In Chinese with English abstract). **13.** Wang X, C., J. Li, **M. Naveed Tahir** and M. Hao. **2010**. Validation of the EPIC model using a long-term experimental data on the semi-arid

	Loess Plateau of China. Mathematical and Computer Modeling, 54: 976-986 (**Impact factor: 1.1643**). **14.** Imran, M., A. Razzaq, S.A.H Bukhari and **M. Naveed Tahir**. **2010**. Optimization of lentil cultivars response to NPK under rainfed condition. J. Agric. Res. 48: 343-351. (ISI Indexed, HEC Recognized) **15. M. Naveed Tahir**, Abid Hussain. 2003. Modeling the growth and yield of new wheat cultivars under varying nitrogen management strategies. University of Agriculture Faisalabad, Pakistan, M.Sc (Hons.) Dissertation. **INTERNATIONAL CONFERENCE PAPER** **1. Muhammad Naveed Tahir**, Jun Li, Bingfeng Liu, Gangfeng Zhao, Fuqi Yao, Chengfeng Cui. Model for remote estimation of nitrogen contents of corn leaf using hyperspectral reflectance under semi- arid condition was presented on **July, 2012** at **11 ICPA Conference, Indiana polis, USA.**

3:

NAME	**Siddique Ullah Baig**
PERSONAL	House No. 155, St. No. 36B, G-9/1, Islamabad 03425264393 siddiquebaig@gmail.com htt://scholar.google.com/citations?user=NMvwXuEAAAAJ&hl=en(Google Scholar) www.linkedin.com/pub/siddique-baig/6/ab8/417 (Linked In) Sex Male | Date of Birth 01/03/1980 | Nationality Pakistani
EXPERIENCE	**POST – PHD** Sept 2014 - August, 2015 Post doctorate Technical University of Eindhoven (TU/e), Netherlands, http://www.tue.nl/ Part of Visualization and Algorithms group within Mathematics and Computer Science department. Work on 3D city modelling, spatial data structure and CityGML March 2014 - to – continue Assistant Professor University of Arid Agriculture Rawalpindi (UAAR), http://www.uaar.edu.pk/ ▪ Teaching GIS and Remote Sensing subjects to PhD and MS Students ▪ Introduction to GIS, Advanced GIS, Web GIS ▪ Part of GIS team to design and develop BS (RS&GIS) study scheme **PRE – PHD** Jan 2010 - August GIS Specialist FATA Livelihood Development Program (A project of USAID), Islamabad, http://fatada.gov.pk/ Spatial analysis, Image Processing March 2002 - July, 2007 MIS/GIS Officer Aga Khan National Council (Aga Khan Development Network), Karachi ▪ Software development, Development of maps, socio-economic surveys
ACHIEVMENTS, EDUCATION AND TRAINING	2010 – 2014 PhD (Geo-informatics) Universiti Teknologi Malaysia (UTM), Johor Bahru, http://www.utm.my Area of Specialization Geoinformatics Thesis title A three-step strategy for generalization of three-dimensional (3D) buildings modelled in City Geography Markup Language 2007 – 2009 MSc. Photogrammetry and Geoinformatics Hochschule für Technik, Stuttgart, Germany, http://www.hft-stuttgart.de/ Area of Specialization Photogrammetry & Geographic Information System (GIS) Thesis title Investigation of spatial reasoning with GIS vector data 2003 – 2006 Masters of Computer Science University of Karachi, Karachi, http://www.utm.my Area of Specialization Computer Science

PERSONAL SKILLS

International Language(s)

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
English C2	C2	C2	C2	C2

IELTS

German	A2	A1	A1	A1	A1
Dutch	A2	A1	A1	A1	A1

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Scholarships

- Erasmus Mundus Action 2 Scholarship for Post Doc (European Commission)
- International Doctoral Fellowship (UTM)

DAAD funding for conference in Kenya organized by Hochschule für Technik, Stuttgart

Academic Awards

- Best Student, PhD (Geo-informatics), 2014 UTM
- High Achiever Award, Aga Education Board, 2014, Islamabad

2nd Position (PhD Research Category), National Geomatic / Geoinformatic Student Competition, 2012, Malaysia

International Experience

- Netherlands, Post Doc Researcher , TU/e, Eindhoven (01/09/2014 to to-date)
- Germany, studied at the Hochschule für Technik Stuttgart (05/09/2007 to 04/06/2009)
- France, 15th Association of Geographic Information Laboratories for Europe (AGILE) International Conference (23/04/2012 to 27/04/2012)
- Kenya, 4th International Summer School and Applied Geoinformatics for Society and Environment (AGSE) conference (15/08/2011 to 19/08/2011)
- Malaysia, Studied at the Universiti Teknologi Malaysia (18/09/2010 to 08/01/2014)

Singapore, Far East Conference organized by IMTEX TRADING PTE (28/03/2012 to 02/04/2012)

PUBLICATIONS

Journal papers

- Baig SU, Rahman AA (2013) A three-step strategy for generalization of 3D building models based on CityGML specifications. GeoJournal, 78:6, 1013–1020. doi:10.1007/s10708-013-9475-0 http://link.springer.com/article/10.1007%2Fs10708-013-9475-0

- Baig SU, Rahman AA (2013) Generalization of buildings within the framework of CityGML, Geo-spatial Information Science, 16:4, 247-255, DOI:

10.1080/10095020.2013.866617
http://www.tandfonline.com/doi/full/10.1080/10095020.2013.866617

Book Chapters

- Baig SU, Rahman AA (2013) Generalization and Visualization of 3D Building Models in CityGML. In: Pouliot J, Daniel S, Hubert F, Zamyadi A (eds) Progress and New Trends in 3D Geoinformation Sciences. Lecture Notes in Geoinformation and Cartography. Springer Berlin Heidelberg, pp 63-77. doi:10.1007/978-3-642-29793-9_4
  http://link.springer.com/chapter/10.1007%2F978-3-642-29793-9_4?LI=true

- Baig SU, Rahman AA, Duncan EE (2013) A Review and Conceptual Framework for Generalization of Maps. In: Abdul Rahman A, Boguslawski P, Gold C, Said MN (eds) Developments in Multidimensional Spatial Data Models. Lecture Notes in Geoinformation and Cartography. Springer Berlin Heidelberg, pp 191-206. doi:10.1007/978-3-642-36379-5_12,
  http://link.springer.com/chapter/10.1007%2F978-3-642-36379-5_12

International Archives, Conference Proceedings

- Baig, SU, Khan AA, and Baig, Saranjam (2014), Recommendations for A Regional Spatial Data Infrastructure to Mobilize Knowledge for Mountain Area Development in Hindu Kush Himalaya (HKH) Region, Applied Geoinformatics for Society and Environment 2014 (AGSE 2014), Stuttgart, Germany, 4-5 – November, 2014
  http://www.applied-geoinformatics.org/ocs/index.php?conference=agse2014&schedConf=agse2014&page=paper&op=view&path%5B%5D=21

- Behnam, A and Baig, SU (2014), Framework for Malaysian 3D SDI in CityGML, XXV International Federation of Surveyors Congress, Kuala Lumpur, Malaysia, 16 – 21, June, 2014
  http://www.fig.net/pub/fig2014/papers/ts11d/TS11D_alizadehashrafi_baig_6899_abs.pdf

- Baig SU, Rahman AA (2013) A Unified 3D Generalization Approach for 3D Building Models Represented in CityGML. Paper presented at the International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 29th Urban Data Management Symposium, London, United Kingdom, 29 – 31 May, 2013
  http://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-4-W1/93/2013/isprsarchives-XL-4-W1-93-2013.pdf

- Baig SU, Rahman AA (2013) Reconstruction of 3D Objects of Assets and Facilities by Using Benchmark Points. International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XL-2/W2, ISPRS 8th 3DGeoInfo Conference & WG II/2 Workshop, 27 – 29 November 2013, Istanbul, Turkey.
  http://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-2-W2/7/2013/isprsarchives-XL-2-W2-7-2013.pdf

	▪ Baig, SU., A. A. Rahman, et al. (2012) Generalization and Visualization of Multiple Levels of Details (LoDs) of Buildings Modeled in CityGML. workshop "3D Web Visualization of Geographic Data" of 15th AGILE International Conference on Geographic Information Science, Avignon, France. http://3dwebgis.di.uminho.pt/wiki/index.php/Complete_program ▪ Baig, SU., M. Suarez, et al. (2011) Integration of Area Frame Sampling Technique and Classification of Satellite Images for Crop Area Estimation. 4th International Summer School and Applied Geoinformatics for Society and Environment (AGSE), Nairobi, Kenya. http://www.applied-geoinformatics.org/index.php/agse/agse2011/paper/view/336
Projects	Sept 2014 - Aug, 2015 ▪ As part of Post Doc, currently working as a Principal investigator (PI) in "Tracing Knowledge Gaps and Deficiencies in Generalization and Visualization Techniques" at Technische Universiteit Eindhoven (TU/e), Netherlands funded by Erasmus Mundus (European Commission). Mar 2012 - Sept 2013 Worked as Co-PI in "Terrestrial Laser Scanning for The New Approach of Large Scale Three -Dimensional (3D) Topographic Mapping" funded by Research Management Certer (RMC) of Universiti Teknologi Malaysia, Vote No. R.J130000.7927.4S016. Jan 2011 - Dec 2011 ▪ Worked as PI in "Automatic Generalization and Compression of 2D and 3D city objects" project funded by Research Management Certer (RMC) of Universiti Teknologi Malaysia, Vote No. Q.J130000.7127.04J81.