Minutes of the Meeting
9th Faculty Board of Studies of Engineering Sciences
at 0930 hours on Friday 28th August, 2015 (through Video Link)

Attendance

Present

BUIC:

1.	Prof. Dr. M. Najam-ul-Islam	Dean (ES), HOD(EE)	Chairman
2.	Prof. Dr. Muhammad Zafar	HOD(E&ES)	Member
3.	Prof. Dr. Shehzad Khalid	HOD(CE)	Member
4.	Assoc. Prof. Dr. Tamim Ahmed Khan	HOD(SE)	Member
5.	Assoc. Prof. Mr. Fazal Wahab	HOD(CS)	Member

BUKC:

6.	Assoc. Prof. Dr. Haroon Rasheed	HOD(EE)	Member
7.	Asstt. Prof. Dr. Humera Farooq	HOD(CS)	Member
8.	Asstt. Prof. Engr. Majid Kaleem	HOD(C&SE)	Member

BULC:

9.	Asstt. Prof. Farhan Saeed Sheerazi	HOD(CS)	Member

In attendance

BUIC

1.	Prof. Dr. Tahseenullah Khan	FM(EES)
2.	Assoc. Prof. Mr. Rashid Kareem	FM(CS)
3.	Asstt. Prof. Dr. Anwar Qadir	FM(EES)
4.	Asstt. Prof. Dr. Amina Jamil	FM(CE)
5.	Asstt. Prof. Khubaib Abuzar	FM(EES)
6.	Asstt. Prof. Mrs. Nadia Imran	FM(EE)

Proceedings

Commencement of the Meeting

1. The Chairman declared the meeting open at 0930 hours and welcomed the members and thanked them for making it convenient to attend.

New Items

Item 0901: Raising the admission eligibility criteria of BS (CS) from 50% to 60% in HSSC
Sponsor: HOD(CS) BUIC Workings Paper: Appendage 0901

The Case & Discussion

2. HOD(CS) BUIC emphasized to increase minimum eligibility criteria of BS(CS) program from 50% to 60% with Pre-Engineering and ICS subjects to improve the quality.
3. HOD(CS) BUKC agreed on increasing the merit from 50% to 60%, however, HOD(CS) BULC disagreed citing the number of applicants at BULC as the campus started BSCS program couple of years ago.
4. HOD(E&ES) BUIC disagreed with increasing the eligibility criteria to 60% and proposed to teach foundation courses of Mathematics from medical and commerce background.
5. HOD(SE) also proposed not to increase the eligibility criteria to 60% and the eligibility criterion of the accreditation council be followed.
6. After deliberation, the house agreed that the students of BS-CS program should have Mathematics background.

Decision 0901

7. The eligibility criteria for BS-CS be changed after the approval of ACM as per following:
    i. HSSC / equivalent with Mathematics and 50% marks

>>**Action:** HOD(CS) BUIC.

Item 0902: Proposal for Non-Credit course of Community Service
Sponsor: HOD(CS) BUIC Working Paper: Appendage 0902

The Case & Discussion

8. HOD(CS) BUIC emphasized that community service course should be offered in CS program in summer and should be a non-credit hour course like in NUST and FJWU.
9. HOD(CS) BUKC pointed out that it would be become department's responsibility to find platform for students just like internships. HOD(CS) BULC shared the same thought.
10. HOD(E&ES) BUIC remarked that it would difficult to get students in summers for the community service course.
11. HOD(CE) BUIC, and HOD(SE) BUIC did not support the proposed agenda.

Decision 0902

12. The point dropped and SRC to continue organizing the community service program.

Item 0903: Changing the title of Research Methods in Ph.D. Studies
Sponsor: HOD(CS) BUIC Working Paper: Appendage 0903

The Case & Discussion

13. HOD(CS) BUIC proposed to change the title of course 'ESC-701: Research Methods in PhD Studies' to 'ESC-501 Research Methodology'.
14. HOD(CE) BUIC pointed out that 'ESC-501 Research Methodology' is '500 level' difficulty and it should be at least '700 level' course for PhD studies.
15. House agreed that one Research Methods course should be sufficient for students either at MS or PhD level.

Decision 0903

16. 'ESC-701 Research Methodology' course be added in PhD roadmap replacing 'ESC-801 Research Methods in PhD studies 'and MS roadmaps of MS(EE), MS(CE), MS(SE), MS(T&N), and MS(CS) programs replacing 'ESC-501 Research Methodology'. The case is to be presented in ACM by HoD(CS).

>>**Action:** HOD(CS) BUIC.

Item 0904: Launch Of M.Sc-CS and M.Sc. -IT at Lahore Campus
Sponsor: HOD(CS) BULC Working Paper: Appendage 0904

The Case & Discussion

17. HOD(CS) BULC proposed to launch MSc. (CS) and MSc. (IT) programs in BULC from spring 2016 semester. It would be a two years program for BA, BSc. students to be taught as an evening program.
18. HOD(CE) BUIC remarked that CS-Department BULC started BS and MS programs within one year and it would be risky to start MSc programs at the moment. HOD(CE) BUIC also enquired that whether they needed to obtain NOC from HEC for launching MSc programs.
19. HOD(CS) BULC confirmed that NOC was not required for MSc programs.
20. HOD(CS) BUKC pointed out that this matter had already been approved in FBOS but Academic Council rejected it in 2013 as BU intended to focus on BS and MS Programs instead of MSc programs. Also BULC should launch new programs after accreditation of existing programs.

Decision 0904

21. The point dropped as the Academic Council rejected this item in 2013. CS – BULC should launch new programs after accreditation of the existing programs.

Item 0905: Change of Pre-requisite and position of Operating System course in BCE Program
Sponsor: HOD(CE) BUIC Working Paper: Appendage 0905

The Case & Discussion

22. HOD(CE) BUIC pointed out that students of BCE require background of Data Structures and Algorithms (DS&A) to enroll Operating Systems (OS), therefore DS&A should be added as a pre-requisite for Operating Systems. The position of OS should be changed from 4^{th} to 5^{th} semester as DS&A is being taught in 4^{th} semester and bring Discrete Mathematics from 5^{th} semester to 4^{th} semester to compensate the credit hours shuffled.
23. HOD(C&SE), HOD(EE), HOD(CS) BUKC agreed on the point of view of HOD(CE) BUIC.
24. HOD(CS) BUIC also supported the suggestion.

Decision 0905

25. Approved. HoD(CE)-BUIC, and HoD(CSE)-BUKC to update the roadmaps & relevant documents accordingly.

>>**Action:** HOD(CE) BUIC, HOD(CSE) BUKC

Item 0906: Swapping of "CE Depth Elective" and "CE Inter-disciplinary Engineering Electives (IDEE)" courses in BCE Program
Sponsor: HOD(CE) BUIC Working Paper: Appendage 0906

The Case & Discussion

26. HOD(CE) BUIC suggested to move Wireless Communication (WC) and Digital Image Processing (DIP) in CE Depth Electives and move VLSI, Distributed Computing (DC) and Real Time Systems (RTS) from CE Depth Electives to IDEE.
27. HOD(C&SE), HOD(EE) and HOD(CS) BUKC agreed with the suggestion of HOD(CE) BUIC.
28. HOD(EE) BUIC suggested that VLSI, DC, and RTS are more relevant to Computer Engineering domain and should be core or elective courses of CE instead of Inter Disciplinary Engineering Electives (IDEE). After deliberation, the house agreed that this needs revision at DBoS at IC and KC

Decision 0906

29. Wireless Communication (WC) and Digital Image Processing (DIP) are moved in CE Depth Electives from IDEE in BCE roadmap. The roadmaps and relevant documents are to be updated by the concerned departments. The other proposal of moving courses from CE Depth Elective to IDEE is to be reviewed in the DBoS of CE at BUIC and BUKC.

>>**Action:** HOD(CE) BUIC, HOD(C&SE) BUKC

Item 0907: Proposed Total Time for Final Examination
Sponsor: HOD(CE) BUIC Working Paper: Appendage 0907

The Case & Discussion

30. HOD(CE) proposed to increase the total time for final examination from 2 hours to 3 hours.
31. HOD(C&SE), HOD(EE) and HOD(CS) BUKC agreed with the proposed suggestion.
32. HOD(CS) BULC and HOD(E&ES) BUIC agreed with the proposed suggestion.
33. HOD(SE) BUIC pointed out that since the breakdown of syllabus before midterm and after midterm was 25% and 75% respectively in final exam so addition of half an hour in final exam would be sufficient.
34. HOD(CE)IC pointed out that presently the exam was conducted in four sessions. If the paper time is increased to 3hrs, then the administration will have to reduce the number of sessions to 3, and the days for conducting the exam will increase to 8.
35. HOD(EE)IC further added that with the implementation of this proposal, 2 extra days will be added in the semester calendar which in turn may add an additional week for each semester.
36. Duration of final examination for '1', '2' and '3' Credit Hour Courses was also discussed.

Decision 0907

37. The case is to be moved on file and input from all stake holders be sought before next FBoS.

>>**Action:** HOD(CE) BUIC.

Item 0908: Proposal for adopting roadmap 2013 of HEC and realignment of BU SE Roadmap
Sponsor: HOD(SE) BUIC,HOD(C&SE) BUKC Working Paper: Appendage 0908

The Case & Discussion

38. HOD(SE) BUIC proposed to opt HEC roadmaps as per guidelines of PEC. He also emphasized that the proposed roadmap is the same as proposed by HEC, and HOD(CSE) KC agreed to the proposal.
39. The suggested changes include: Analytical Calculus and Analytical Geometry should be moved to 2nd semester and Discrete Mathematics should be moved to 1st semester. Pakistan Studies should be moved to 6th semester. Object Oriented Software Engineering course should be introduced and should be taught in 4th semester. Software Engineering should be moved to electives list and Human Computer Interaction should be taught in 5th semester.

Decision 0908

40. The case is endorsed and referred to ACM. HOD(SE) IC to prepare a comprehensive agenda item highlighting the changes made, and to add outlines for the courses added. The course codes are to be added / maintained as per BU unified course code scheme.

>>**Action:** HOD(SE) BUIC

Item 0909: Change in elective courses
Sponsor: HOD(SE) BUIC, HOD(C&SE) BUKC Working Paper: Appendage 0908

The Case & Discussion

41. HOD(SE) BUIC proposed to remove and delete few elective courses in view of HEC roadmap.

Decision 0909

42. The agenda item is endorsed and merged with previous agenda item (0908). Point dropped.

Item 0910: Doctor of Philosophy (PhD) in Geology, Geophysics and Environmental Sciences
Sponsor: HOD(E&ES) BUIC Working Paper: Appendage 0910

The Case & Discussion

43. HOD(E&ES) BUIC proposed to offer PhD programs in Geology, Geophysics and Environmental Sciences from spring 2016 semester.
44. The house was informed that the roadmaps were prepared in consultation with E&ES – BUKC and approved by DBoS at BUIC.
45. HOD(EE), HOD(SE), HOD(CS) BUIC suggested launching one PhD program at a time and obtain its approval from HEC first instead of launching 3 PhD programs.
46. HODs(SE, CS) BUIC agreed with the proposal of HOD (EE) BUIC.

Decision 0910

47. The proposal to launch PhD – Geology is endorsed by the house and referred to ACM for consideration. The other programs are to be launched at a later stage. HOD(E&ES) to prepare a comprehensive case for ACM.

>>**Action:** HOD(E&ES) BUIC

Item 0911: Curricula revision of BS and MS programs in Geology, Geophysics and Environmental Sciences
Sponsor: HOD(E&ES) BUIC Working Paper: Appendage 0911

The Case & Discussion

48. HOD (E & ES) presented curricula revision for all BS and MS programs, in Geology Geophysics and Environmental Sciences, after their approval from the DBOS and feedback from E&ES department at Karachi Campus.

Decision 0911

49. The housed endorsed the revision and referred the case to academic council for consideration.

>>**Action:** HOD(E&ES) BUIC

Item 0912: Revision of honorarium rates of BS Thesis supervisor, co-supervisor and examiner in EES department.
Sponsor: HOD(E&ES) BUIC Working Paper: Appendage 0912

The Case & Discussion

50. HOD(E&ES) BUIC proposed to revise the honorarium of BS Thesis for Supervisor, Co-supervisor and external examiner in E&ES department.

Decision 0912

51. The honorarium for one BS Thesis (supervisor and co-supervisor) in EES department is to be increased from Rs. 5000 to Rs. 8000. For external examiner, the honorarium is to be increased from Rs. 1000 to Rs. 3000 PKR and for internal examiner Rs. 2000.
52. The case endorsed by the FBOS and referred to ACM for approval.

>>**Action:** HOD(E&ES) BUIC

Item 0913: Inclusion of FYP Grades in Eight Semester CGPA Calculation.
Sponsor: HOD(EE) BUKC Working Paper: Appendage 0913

The Case & Discussion

53. HOD(EE) BUKC discussed the case in which students got expulsion from Bachelors program because their FYP grades were not counted towards CGPA calculation at the end of 8th semester.
54. The Chair pointed out that the item had a higher priority and did not need the waiting for FBOS and Academic Council decision and the case be moved on file.
55. HODs of IC pointed out that such problem didn't exist at BUIC due to submission of FYP result with course results.
56. HODs of BUKC informed the house that the results of the said students were forwarded within two weeks of final exams in Spring'2015, and as the next semester i.e. Fall was to start in 2 months time (September), there was no point in not considering the FYP result by the exam department at BUKC.

Decision 0913

57. The case is to be moved on file (high priority) to change students' DROP status by HOD(EE) BUKC.
58. The case is referred to ACM to avoid such situation in future. HOD(EE) KC to prepare working paper with details. The results of the FYP for Engineering Sciences are to be submitted within 2 weeks of end of semester (last day of classes).

>>**Action:** HOD(EE) BUKC.

Item 0914: Availability of Past Exam Papers in Library.
Sponsor: HOD(EE) BUKC Working Paper: Appendage 0914

The Case & Discussion

59. HOD(EE) BUKC proposed that the past papers should be placed in library to help students for better preparation.
60. HOD(C&SE) and HOD(CS) BUKC agreed with this proposal.
61. HOD(CS) BULC and HOD(SE) BUIC pointed out that this would lead semester system to annual system and students would cram the past papers.
62. HOD(E&ES) BUIC said that students usually pass on the papers to new students and this agenda should not be made compulsory. HOD(CE) BUIC shared the concerns of HOD(E&ES) BUIC.
63. After a long deliberation, the house agreed that there is no harm in sharing the past exams with the students at department level. However, it can not be considered as university's policy.

Decision 0914

64. The departments / FMs may share past exams with the students and the policy be devised at DBoS. The point dropped.

Item 0915: Weightage of Candidate's Interview in Admission Process of BS programs.
Sponsor: HOD(EE) BUKC Working Paper: Appendage 0915
The Case & Discussion

65. HOD(EE) BUKC proposed that the interview weightage should be increased to get better student admitted in BU.
66. HOD(CS) BUKC shared the same concerns and highlighted that faculty members only verified the documents. She stressed that there should be transparency in the selection procedure.
67. HOD(CS) BULC shared the same concerns and pointed out that it was very difficult for faculty members to verify the documents (no expertise to verify the originality of transcripts / mark sheets) and they should not be appointed for this task.
68. HOD(E&ES) BUIC suggested that there should be interviews with weightage while HOD(CE) BUIC suggested that there should not be any interviews for BS programs.
69. HOD(EE) BUIC also suggested that faculty members should not verify the documents, and should only check the eligibility criteria for admission.

Decision 0915

70. A committee is constituted of the following members:
    a. HOD(EE) BUKC – Chair
    b. HOD(CE) BUIC
    c. HOD(CS) BULC
71. The committee is to propose an SOP for BS admissions in Engineering Sciences. The SOP is to be presented in the next FBOS.

>>Action: HOD(EE) BUKC

Item 0916: Remuneration for Internal Examiner in MS/PhD Program.
Sponsor: HOD(EE) BUKC Working Paper: Appendage 0915

The Case & Discussion

72. HOD(EE) BUKC proposed to have remuneration for internal examiner in MS/PhD program. For MS level it should be Rs. 5,000 and for PhD level it should be Rs. 10,000.
73. HOD(CE) BUIC compared the current honorarium with other HEIs and suggested 2000 PKR for MS and 5000 PKR for PhD. It was also discussed that the current honorarium at BU for BS FYP evaluation is 2000 PKR and for MS 1000 PKR.

Decision 0916

74. The proposed honorarium (endorsed by FBOS) for MS and PhD Thesis Evaluation at BU to be presented at ACM for final approval:

Sr. No.	Program	Status	Proposed Honorarium	Existing Honorarium
1	PhD	Internal Examiner	5,000	1,000
2		External Examiner	8,000	5,000
3	MS	Internal Examiner	3,000	1,000
4		External Examiner	6,000	5,000

>>**Action:** HOD(EE) BUKC.

Item 0917: Revised Roadmap of MSEE and Addition of Elective Courses in MSEE Program
Sponsor: HOD(EE) BUKC Working Paper: Appendage 0917

The Case & Discussion

75. HOD(EE) BUKC proposed new roadmap and elective course 'EEX 781 Research Study in Special Topics' for MSEE program for thesis students to gain experience in any field in which they are interested for research.
76. HOD(EE) BUIC pointed out that the said roadmap is not yet approved by DBoS of BUIC and should go through revision before presentation at ACM.
77. After detailed discussion, it was decided to revise the current roadmap of MSEE by the concerned departments at BUIC and BUKC and to retable the case in the next FBoS.

Decision 0917

78. The MSEE roadmap is to be revised by EE departments at BUIC & BUKC and is to be presented in the next FBoS.

>>**Action:** HOD(EE) BUKC, HOD(EE)BUIC.

Item 0918: Recommendations for signing MOU for split PhD degree program with University of Malaya Kuala Lumpur.
Sponsor: HOD(EE) BUIC Working Paper: Appendage 0918

The Case & Discussion

79. The case was referred by file (DD-FCP) and Rector BU sought the input FBOS of Engineering Sciences.
80. HOD(CS) BUIC suggested that there should be scholarships for FMs to pursue higher studies abroad.
81. HOD(EE) BUKC suggested to drop this item from 9th FBOS.

Decision 0918

82. Bahria University should not opt the proposition of Split PhD in its current form. Dean-ES to communicate the decision on file. Point dropped.

>>**Action:** Dean (ES).

Item 0919: To introduce the concept of Adjunct faculty in Bahria University.
Sponsor: HOD(EE) BUIC Working Paper: Appendage 0919

The Case & Discussion

83. HOD(C&SE), HOD(EE), HOD(CS) BUKC agreed on having the concept of adjunct faculty in Bahria University.
84. HOD(CE), HOD(CS) BUIC also agreed but pointed that affiliation for research should be from Bahria University and cash rewards for research should not be received from multiple sponsorship parties.

Decision 0919

85. The house endorsed and referred the proposal to ACM for consideration.

>>**Action:** Dean (ES).

Closing the Meeting

86. There being no further points, the Chair brought the meeting to close at about 13:15 hrs, thanking the participants for their wholehearted participation.

Dr. M. Najam-ul-Islam
8th September 2015 Dean (ES), Head FBoS

Distribution:

BUHQ:	Rector, Pro-Rector, Registrar, DAA, DE, DQA, D(R&D)
BUIC:	DG BUIC, DIC, HOD(EE), HOD(SE), HOD(CE), HOD(CS), HOD(EES)
BUKC:	DG BUKC, DKC, HOD(EE), HOD(CSE), HOD(CS), HOD(EES)
BULC:	DLC, HOD(CS)

Appendage 0901

Agenda 0901

Raising the admission eligibility criteria of BS (CS) from 50% to 60% in HSSC

Initiated by: HOD (CS), Islamabad Campus

1. **Background to the Case**

   Currently, the eligibility criteria for admission to BS (CS) program are "50% marks in Intermediate/Equivalent (Any Discipline) provided candidate's Matric/Equivalents in Science Group".

   For the last 2 years, a large number of students are applying for admission to CS program at Islamabad, Karachi and Lahore. This is the most appropriate time to raise the admission eligibility criteria of BS (CS) program from 50% to 60% marks in HSSC.

   The agenda item was presented in the Departmental Board of Studies on 13th August 2015. The DBOS recommended the following eligibility criteria for BS (CS) program:

   "60% Marks in Intermediate/equivalent in Pre-Engineering/Computer Science group".

2. **Establishments/HR Effect if any**

   Nil.

3. **Financial Effect**

   Nil

4. **Recommendations**

   Departmental Board of Studies recommended the above mentioned raise of eligibility criteria for admission to BS(CS) program.

DISCUSSION

FBOS Decision:

Action By:

Deadline (if any):

Appendage 0902

Agenda Item 0902
Proposal for non-credit course of Community Service

Initiated by: HOD (CS), Islamabad Campus

5. Background to the Case

Currently the Community Service is a degree requirements to be done by student for 40 hours as non-credit. SRC and department concerned are arranging the community service on semester basis. During the regular semesters (fall and spring) it is extremely difficult for students as well as for faculty members to spare time for community service. Due to this reason, the community service program is running on ad-hoc basis and students are not taking it seriously.

Faculty members of computer science have suggested that on the pattern of NUST and Fatima Jinnah Women University, the community service should be added to roadmaps as non-credit course to all undergraduate programs to bring seriousness in this important national level activity.

The DBOS recommended Community Service Program as non-credit course to be offered to all undergraduate students in summer sessions. A faculty member conducting this course should be paid Rs.50, 000/- as an honorarium and logistic facility for CSP activities outside the university will be provided by the concerned campuses.

6. Establishments/HR Effect if any

Nil.

7. Financial Effect

Nil

8. Recommendations

Departmental Board of Studies recommended the CSP as non-credit course to be added in the roadmap of all undergraduate programs during summer sessions.

DISCUSSION

FBOS Decision:

Action By:

Deadline (if any):

Appendage 0903

Agenda 0903
Changing the title of Research Methods in Ph.D. Studies

Initiated by: HOD (CS), Islamabad Campus

9. Background to the Case

In the last Mock Assessment Visit of Ph.D. (CS) program of Bahria University, Islamabad campus, it was pointed out by the members of Assessment team to change the title of the course from "ESC-701 Research Methods in Ph.D. Studies" to "ESC-501 Research Methodology".

The agenda item was presented in the DBOS. Members agreed to change the title from "ESC-701 Research Methods in Ph.D. Studies" to "ESC-501 Research Methodology".

10. Establishments/HR Effect if any

Nil.

11. Financial Effect

Nil

12. Recommendations

Departmental Board of Studies recommended the change in the title from "ESC-701Research Methods in Ph.D. Studies" to "ESC-501 Research Methodology".

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DISCUSSION

FBOS Decision:

Action By:

Deadline (if any):

Appendage 0904

Agenda item 0904

Initiated by: _HOD BULC_

Subject:LAUNCH OF M.SC-CS AND M.SC-IT AT LAHORE CAMPUS

13. Background

Department of CS & IT was established at BULC in Fall 2014. Initially it launched two programs namely BSCS and BSIT. Both the programs received an overwhelming interest from Lahore and a total of 186 students were enrolled in the stated programs by Spring 2015. Currently 134 studentsare studying in BSCS whereas the strength of IT students has reached to a total of 52 students.

14. Rationale

Keeping into consideration the confidence of students in the CS & IT programs of Bahria University at BULC, it was envisaged in the DBOS that a diversity in CS programs will help raise the flag of Bahria University in Lahore. To serve this aim of diversity, it was discussed that M.SC Computer Science and M.SC Information Technology, being the prevalent programs possess the inertia to be launched from the platform of Bahria University Lahore Campus as evening programs. Currently, in Lahore the program is being offered by the following institutions

- PUCIT (M.SC Computer Science)
- Virtual University (M.SC Computer Science &M.Sc Information Technology)
- UMT (M.SC Computer Science &M.Sc Information Technology)
- University of Lahore (M.SC Computer Science &M.Sc Information Technology)

During a survey conducted for the feasibility of the program at BULC, it was observed that the subject programs received an encouraging response from students specifically from students looking forward for a career & academic background transformation.

15. Recommendations

Based upon the recommendations of the DBOS, the following is recommended

a) Two years four semester degree program namely (M.SC Computer Science &M.Sc Information Technology) to be launched from BULC as evening programs in Spring 2016. Feasibility study of the program including Eligibility Criteria and Road Map is annexed at Annex'A'.
b) To ensure quality, student's strength may be capped at 25 students each program thus making a provision of one section of each program in each admission intake.

16. Establishments/HR Effect if any

No Further Physical Infrastructure Required as the program will be offered in evening.
01 Evening Coordinator required

17. Financial Effect

Revenue Projection (At Completion of Cycle in Fall 2017): PKR 48.55 Million (Based upon PKR 97,100 PER SEMESTER)

Faculty Expenditure (Spring 2016-Fall 2017): PKR 4.15 Million
Overhead Expenditure : PKR 7.3 Million
Evening Coordinator(Spring 2016-Fall 2017): PKR 0.32 Million
Library : PKR 0.5 Million
Advertising Expense : PKR 0.8 Million
PROFIT (Spring 2016-Fall 2017) : PKR 35.48 Million

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Masters in Information Technology (MIT)

Eligibility Criteria

BA/BSc Program in any of the following: Maths, Physics, Computer Science, Commerce, Stats, Economics.

ROAD MAP

Semester 1 (18 credit hrs)

	Subjects	Credit Hrs
1	Fundamentals of Algorithms	3
2	Introduction to Computer Programming	3
3	Data Base Systems	3
4	Fundamentals of Management	3
5	Introduction to Marketing	3
6	English Comprehension	3
Total		18

Semester 2 (18 credit hrs)

	Subjects	Credit Hrs
1	Introduction to Computer Architecture	3
2	Software Engineering I	3
3	Data Structures	3
4	Data Communication	3
5	Organizational Behavior	3
6	Introduction to Accounting	3
Total		18

Semester 3 (18 credit hrs)

	Subjects	Credit Hrs
1	Operating Systems Concepts	3
2	Object Oriented Programming	3
3	Web Design and Development	3
4	Telecommunication Systems	3
5	Financial Management	3
6	Technical and Business Writing	3
Total		18

Semester 4 (18 credit hrs)

	Subjects	Credit Hrs
1	Distributed Data Base Systems	3
2	Visual Programming	3
3	Computer Networks	3
4	E-Commerce	3
5	Human Resource Management	3
6	Communication Skills	3
Total		18

Msc. Computer Science

Eligibility Criteria

BA/BSc Program in any of the following: Maths, Physics, Computer Science, Commerce, Stats, Economics.

ROAD MAP

Semester 1 (18 credit hours)

	Subjects	Credit Hrs
1	Programming Fundamentals	3
2	Digital Logic Design	3
3	Theory of Computation	3
4	Technical and Business Writings	3
5	System Analysis and Design	3
6	Database System	3

Total	18

Semester 2 (18 credit hours)

	Subjects	Credit Hrs
1	Computer Architecture	3
2	Object Oriented Programming	3
3	Assembly Language Programming	3
4	Data Structures	3
5	Advance Database System	3
6	Communication Skills	3
Total		18

Semester 3 (18 credit hours)

	Subjects	Credit Hrs
1	Software Engineering	3
2	Web Programming	3
3	Visual and Object Oriented Programming	3
4	Operating Systems	3
5	Design and Analysis of Algorithm	3
6	Project-I	3
Total		18

Semester 4 (18 credit hours)

	Subjects	Credit Hrs
1	Computer Organization and Device Automation	3
2	Automata Theory	3
3	Data Communication and Computer Networks	3
4	Artificial Intelligence	3
5	Compiler Construction	3
6	Project-II	3
Total		18

FUTURE CAREER PROSPECTS

Following sectors are looking towards CS & IT professionals both in the local and the global market:

- Contract Research Organizations (CRO)
- Software Companies like NETSOL
- Big Data Centres like NADRA
- Public & Private Sector Organizations

COMPETITOR'S REVIEW

Most of the institutions offering these programs are located within 3-4 Kms range of Bahria University Lahore Campus. Following list indicate the place at which the program is being offered with a student strength of 50 students per intake.

- PUCIT (M.SC Computer Science)
- Virtual University (M.SC Computer Science &M.Sc Information Technology)
- UMT (M.SC Computer Science &M.Sc Information Technology)
- University of Lahore (M.SC Computer Science &M.Sc Information Technology)

PROGRAM ENROLLMENT PROJECTION (SPRING 2016-SPRING 2020)

	M.SC -CS	M.SC-IT	EXISTING
S-2016	25	25	50
F-2016	25	25	100
S-2017	25	25	150
F-2017	25	25	200
S-2018	25	25	200
F-2018	25	25	200
S-2019	25	25	200
F-2019	25	25	200
S-2020	25	25	200

Appendage 0905

Agenda item 0905

Initiated by: HOD CE, Islamabad Campus

Subject: Change of Pre-requisite and position of Operating System course in BCE Program

1. **Background to the Case**

- Operating System is one of the fundamental courses of the BCE program in which students learn about the basic understanding, working and architecture of different Operating Systems. This course also accompanies a lab section in which some higher level programming skills are required from the students. Programming and Design concepts learnt in the course of Data Structures and Algorithms are of utmost importance for getting significant understanding of Operating Systems course.
- Since, Operating Systems (OS) and Data Structures and Algorithms (DS&A) are offered in the same semester (i.e., 4th Semester) of the BCE program so Operating Systems course needs to be moved to the next semester in order to cater for the pre-requisite change.
- All members of DBOS, in the 3rd DBOS meeting agreed to make Data Structures and Algorithms a pre-requisite course of the Operating Systems course. The committee observed that this change will require the position of Operating Systems course to be changed in the BCE program. The committee discussed the option of moving OS course from 4th semester to 5th semester and Discrete Mathematics course from 5th to the 4th semester.

2. **Recommendations**

There are following recommendations for the above agenda item:

- Make Data Structures and Algorithms a pre-requisite course of Operating Systems course
- Move Operating Systems from 4th semester to 5th semester
- Move Discrete Mathematics from 5th semester to 4th semester

3. **Establishments/HR Effect if any**

NIL

4. **Financial Effect**

NIL

DISCUSSION

Council Decision:

Action By: Deadline

Appendage 0906

Agenda Item 0906

Initiated by: HOD CE, Islamabad Campus

Subject: Swapping of "CE Dep th E lective" an d "CE In ter -disciplinary Engineering E lectives (IDE E)" cou rs es in BCE Program

1. Background to the Case

- The department has observed some discrepancies in the elective courses of the BCE program, due to which some courses could never be offered from the CE Depth Elective courses. Also, some very important courses/domains of the CE are missing from the Depth Elective subset of the courses in the BCE program.
- There has been an in-depth discussion over these issues and the faculty found the following problems in the CE Depth Elective and Inter-Disciplinary Engineering Electives pools of subjects:

S. #.	Course	Current Category	Discrepancy
1.	VLSI Design	CE Depth Elective	Course belongs to Electronics Engineering domain while it is currently present in CE Depth Elective courses
2.	Distributed Computing	CE Depth Elective	*Total Credit Hours – 3.0
3.	Real Time Systems	CE Depth Elective	*Total Credit Hours – 3.0
4.	Digital Image Processing	IDEE	This course falls under one of the vital and most important areas of research in computer engineering, but it is missing from the Depth Electives.
5.	Wireless Communications	IDEE	Communications being an important stream of the computer engineering, but no course is present in the CE Depth Elective form this area.

* The department is supposed to offer five courses (4 credit hrs. each) with a total of 20 Credit Hours from CE Depth Electives. So, these courses could never be offered from the CE Dept Elective category.

2. Recommendations

There are following recommendations for the above agenda item:

- The courses of Digital Image Processing and Wireless Communications are to be moved from IDEE to CE Depth Electives.
- The courses of VLSI Design, Distributed Computing and Real Time Systems are to be moved from CE Depth Electives to IDEE subset of the BCE courses.

3. Establishments/HR Effect if any

NIL.

4. Financial Effect

NIL.

DISCUSSION
Council Decision:
Action By:
Deadline (if any):

Appendage 0907

Agenda Item 0907

Initiated by: HOD CE, Islamabad Campus

Subject: Proposed Total Time for Final Examination

1. **Background to the Case**

   - The Mid-term and Final Examinations in the Engineering Sciences contribute 20% and 50% to the final result respectively, but their timings are in-consistent, i.e., 1.5 hrs. and 2.0 hrs.
   - Also, there are a number of subjects in which the teacher wants to check the analytical and designing skills of the students in the final exams which becomes pretty hard due to in-sufficient total allowed time of the examination.

2. **Recommendations**

   - Extend the total allowed time for the final examination from 2.0 hrs. to 3.0 hrs.

3. **Establishments/HR Effect if any**

   NIL.

4. **Financial Effect**

   NIL.

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Agenda Item
0908

Initiated by: HOD SE, Islamabad Campus

Subject: Proposal for adopting roadmap 2013 of HEC and realignment of BU SE Roadmap and Proposal for revision of SE electives, supporting electives, general electives & domain specific electives

1. Background to the Case

HEC has drafted and uploaded revised roadmap for BE Software Engineering programs in Pakistan. It is a reaccreditation requirement from PEC that we regularly revise BE SE roadmap. For this purpose, a departmental committee headed by Dr. Awais Majeed was formed and the following members were included:

- Dr. Awais Majeed (chairman Roadmap review committee)
- Dr. Kashif Zia
- Dr. Shahid Nazir
- Mr. Bilal Ashraf Awan

Furthermore, Software engineering department offers two types of courses in the Bachelors of Software Engineering (BSE) program - core courses and elective courses. The roadmap review has posed requirement of revision of the electives lists as well. For this purpose, the same committee was requested to do the electives lists revisoion.

2. Recommendations

The roadmap, placed as Annexure to this document, and courses revision stands approved
at the level of DBOS. It is recommended that the roadmap revision may be submitted to FBOS for approval. This roadmap, if approved by FBOS and subsequently by ACM, shall be effective from Fall 2016 entry onwards. Course codes and final outlines for added courses would be provided for ACM after approval from FBOS.

The revision of electives lists, placed as Annexure to this document, stands approved at the level of DBOS. It is recommended that the roadmap revision may be submitted to FBOS for approval. This roadmap, if approved by FBOS and subsequently by ACM, shall be effective from Fall 2016 entry onwards. Course codes and final outlines for added courses would be provided for ACM after approval from FBOS.

This was shared with Computer and Software Engineering Department in BUKC and approval was consented by the Head CSE as well.

3. **Establishments/HR Effect if any**

Nil

4. **Financial Effect**

Nil

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

BS Software Engineering

(Fall 2016)

ROADMAP FOR BACHELOR OF SOFTWARE ENGINEERING

SEMESTER 1

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
None	CSC-110	Computing Fundamentals	2	2	0
None	CSL-110	Computing Fundamentals Lab	1	0	1
None	CSC-113	Computer Programming	3	3	0
None	CSL-113	Computer Programming Lab	1	0	1
None	GSC-221	Discrete Mathematics	3	3	0
None	GSC-113	Applied Physics	3	3	0
None	GSL-113	Applied Physics Lab	1	0	1
None	ENG-103	English – I	2	2	0
			16	**13**	**3**

SEMESTER 2

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
None	GSC-110	Applied Calculus & Analytical Geometry	3	3	0
CSC-113	CSC-210	Object Oriented Programming	3	3	0
CSL-113	CSL-210	Object Oriented Programming Lab	1	0	1
None	CEN-120	Digital Logic Design	3	3	0
None	CEL-120	Digital Logic Design Lab	1	0	1
		GE/University Elective I	3	3	0
None	HSS-120	Communication Skills	3	3	0
None	ISL-101	Islamic Studies/Ethics (for Non-Muslims)	2	2	0
			19	**17**	**2**

Semester 3

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
CSC-210	SEN-210	Introduction to Software Engineering	3	3	0
CSC-210	CSC-221	Data Structures & Algorithms	3	3	0
CSL-210	CSL-221	Data Structures & Algorithms Lab	1	0	1
CEN-120	CEN-221	Computer Architecture & Organization	3	3	0
CEL-120	CEL-221	Computer Architecture & Organization Lab	1	0	1
None	GSC-121	Linear Algebra	3	3	0
		GE/University Elective II	3	3	0
			17	**15**	**2**

SEMESTER 4

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
CEN-221	CSC-320	Operating Systems	3	3	0
CEL-221	CSL-320	Operating Systems Lab	1	0	1
		Supporting Elective I	3	3	0
	SEN-334	Object oriented Software Engineering	3	3	0
	SEN-334	Object oriented Software Engineering Lab	1	0	1
CSC-113	CSC-220	Database Management Systems	3	3	0
CSL-113	CSL-220	Database Management Systems Lab	1	0	1
None	HSS-320	Technical Writing & Presentation Skills	3	3	0
			18	**15**	**3**

Semester 5

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
SEN-210	SEN-458	Software Requirements Engineering	3	3	0
None	GSC-122	Probability & Statistics	3	3	0
CEN-120	CEN-222	Data Communication & Networking	3	3	0
CEL-120	CEL-222	Data Communication & Networking Lab	1	0	1
None	SEN-320	Human Computer Interaction	3	3	0
		SE Elective I	3	3	0
		Supporting Elective II	3	3	0
			19	**17**	**2**

SEMESTER 6

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
SEN-458	SEN-420	Software Quality Engineering	3	3	0
SEN-458	SEN-457	Software Design & Architecture	2	2	0
SEN-458	SEL-457	Software Design & Architecture Lab	1	0	1
None	PAK-101	Pakistan Studies	2	2	0
		SE Application Domain Elective –I	3	3	0
		SE Elective II	4	3	1
		SE Elective III	3	3	0
			18	**16**	**1**

Semester 7

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
	ESC-498	Project I	3	3	0
SEN-210	SEN-410	Software Project Management	3	3	0
None	HSS-424	Engineering Ethics	2	2	0
		SE Application Domain Elective –II	3	3	0
		SE Elective IV	3	3	0
		SE Elective V	3	3	0
			17	**17**	**0**

SEMESTER 8

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
	ESC-499	Project II	3	3	0
		GE/University Elective IV	3	3	0
		GE/University Elective III	3	3	0
		Supporting Elective III	3	3	0
			12	**12**	**0**

Elective Software Engineering Courses -15 Credit Hours

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
SEN-210	SEN-440	Software Engineering Economics	3	3	0
SEN-210	SEN-449	Business Process Automation	3	3	0
None	SEN-453	Information System Audit	3	3	0
GSC-110	SEN 324	Software Metrics & Estimation	3	3	0
CSC-113	SEN-310	Web-Engineering	3	2	1
GSC-110	SEN 323	Formal Methods in Software Engineering	3	0	0
GSC-110	SEN 311	Software Construction	3	2	1
CSC-210	CSC-456	Distributed Computing	3	2	1
None	CSC-315	Theory of Automata	3	3	0
CSC-221	CSC-321	Design and Analysis of Algorithms	3	3	0
CSC-113	CSC-445	Principles of Programming Languages	3	3	0
CSC-113	CSC-313	Visual Programming	3	2	1
None	CSC-411	Artificial Intelligence	3	2	1
GSC-210	CEN 453	Real Time Systems	3	2	1
None	CSC-444	Computer Graphics	3	2	1
None	SEN-448	Software Applications for Mobile Devices	3	2	1
None	SEN 332	Big Data Analytics	3	3	0
SEN-448	SEN-459	Mobile and Pervasive Computing	3	3	0
None	SEN325	Cloud Computing	3	3	0
None	SEN-450	Design Pattern	3	3	0
None	CSC-448	Introduction to Bio-Informatics	3	3	0
None	SEN-452	Agile Development	3	3	0

Elective Supporting Courses – 9 Credit Hours

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
GSC-110	GSC-320	Numerical Analysis	3	3	0
EEN-210	EEN-442	Digital Electronics	4	3	1
GSC-113	EEN-210	Basic Electronics	4	3	1
CSC-113	SEN-441	Mathematical tools for Software Engineering	3	2	1
GSC-120/ GSC-310	GSC-445	Operation Research	3	3	0
GSC-310	CEN-450	Simulation and Modeling	3	2	1
CSC-320	CEN-321	Microprocessors & Interfacing	4	3	1
GSC-113	CEN 458	Robotics	3	3	0
GSC-113	EEN 110	Linear Circuits Analysis	3	3	0
EEN 313	EEN 325	Digital Signal Processing	3	3	0
GSC-113	CEN 440	Embedded System Design	4	3	1
GSC-110	CSC 453	Information Theory	3	3	0
GSC-110	GSC 210	Differential Equations	3	3	0
GSC-110	GSC-220	Complex Variables and Transforms	3	3	0
GSC-113	GSC-446	Physics-II(Mechanics)	3	3	0
None	GSC-441	Bio-Chemistry	3	3	0
None	GSC-442	Biology/ Genetics	3	3	0
SEN-420	CEN-443	Fault Tolerant Systems	4	3	1
CEN-222	CEN-454	System Programming	4	3	1

General Elective Courses–12 Credit Hours

Pre-Req	Course Code	Course Title	Total Credit Hours	Theory	Lab
None	HSS-452	English Literature	3	3	0
None	ECO-457	Economics	3	3	0
None	HSS-202	Introduction to Sociology	3	3	0
None	PSY-101	Introduction to Psychology	3	3	0
None	HSS-111	Introduction to International Relations	3	3	0
None	HSS-459	Foreign Language (Arabic, French etc.)	3	3	0
None	MGT-111	Principles of Management	3	3	0
None	HSS-453	Human Resource Management	3	3	0
None	HSS-461	Accounting & Finance	3	3	0
None	HSS-456	Organizational Behavior	3	3	0
None	HSS-115	Introduction to Media Studies	3	3	0
None	HSS-201	Introduction to Anthropology	3	3	0
None	HSS-421	Entrepreneurship & Leadership	3	3	0

Domain Specific Elective Courses – 6 Credit Hours

Domain Specific Elective Courses		
Sr. #	**Domain Name**	**Proposed Courses**
1.	Information Systems	CEN-451 Data Encryption and Security CSC-452 Data mining CSC 454 Data Warehousing CSC-458 Management Information System SEN 326 Advanced Database Management Systems SEN 327 Distributed Database systems
2.	Image Processing and Computer Vision	EEN-313 Signals and Systems CEN-444 Digital Image Processing CSC-464Computer Vision
3.	Multimedia & Gaming Systems	EET-452 Multimedia Communication SEN-328 Game Application Development SEN-329 Digital Animation
4.	Intelligent Systems	SEL 443 Introduction to Soft Computing CSC 441 Natural Language Processing SEN 330 Agent based Computing SEN 331 Scientific Computing

SEN 324: Software Metrics and Estimation

Credit Hours: 3
Prerequisites: Software Engineering

Course Outline:

Introduction to foundations of measurement theory, models of software engineering measurement, software products metrics, software process metrics and measuring management. Measurement theory (overview of software metrics, basics of measurement theory, goal-based framework for software measurement, empirical investigation in software engineering). Software product and process measurements (measuring internal product attributes: size and structure, measuring external product attributes: quality, measuring cost and effort, measuring software reliability, software test metrics, object-oriented metrics) Measurement management

Reference Materials:

1. *A Rigorous and Practical Approach Software Metrics*, N.E. Fenton, S.L. Pfleeger, PWS Publishing (or Latest Edition).
2. *Metrics and Models in Software Quality Engineering*, Stephen H. Kan, Addison-Wesley Professional (or Latest Edition).
3. *Software Engineering Measurement*, John C. Munson, Auerbach Publications (or Latest Edition).

SEN 325: Cloud Computing
Credit Hours: 3
Prerequisites: *

Course Outline:

Datacenter Architectures, Cloud Stack , Technology Trends, Consistency, Availability, Partitions, Cluster File Systems, Data-flow Computation Frameworks, Key-Value Store and Interactive Query Systems, Big Data in the Clouds , Geographic distributed Storage, Programming Languages for the Cloud, DBases in the Cloud, In-Memory Frameworks, Google file system, Hadoop file system, MapReduce, OSes and Clouds Networking: topologies, Networking: Traffic Management, Networking: Transport Protocol Improvements, Security, Scheduling and Resource Management in clouds, Software Level Agreements. Cloud Computing Trends &Issues

Reference Materials:

1. Cloud Computing Implementation, Management, and Security by John W. Rittinghouse and James F. Ransome, Taylor and Francis Group, LLC (2010). ISBN 978-1-4398-0680-7 WWW resources
2. Cloud Computing Explained: Implementation Handbook for Enterprises by John Rhoton, Recursive Press (2009). ISBN-10: 0956355609.
3. Cloud Computing and SOA Convergence in Your Enterprise: A Step-by-Step Guide by David S. Linthicum, Addison-Wesley Professional; 1st 191 Edition (2009). ISBN-10: 0136009220.

SEN 459: Mobile & Pervasive Computing

Credit Hours: 3
Prerequisites: SEN 448, SEN 310

Course Outline:

Mobile and Pervasive Computing Basics, Vision And Challenges. Wireless Technologies. Mobile and Pervasive Computing Environments: Mobile Computing Infrastructure, Characteristics of Mobile Computing Environments, Challenges of Mobile Computing, Infrastructure of Pervasive Computing, Characteristics of Pervasive Computing Environments. Pervasive Computing Applications. Requirements of Pervasive Computing Applications. Smart Devices and Services. HCI Aspects of Smart Devices. Tagging, Sensing and Controlling. Context-Aware Computing and Systems. Intelligent Systems and Interaction. Ubiquitous Communication. Overview of P2P Computing, RFID, Smart Home, Autonomic Systems and Artificial Life, Utility Computing, Management of Smart Devices.

Reference Materials:

1. *Ubiquitous Computing: Smart Devices, Environments and Interactions* by Stefan Poslad, Wiley; 1st Edition (April 27, 2009). ISBN-10: 0470035609
2. *Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML* by Reza B'Far and Roy T. Fielding, Cambridge University Press (2004). ISBN-10: 0521817331.
3. *Fundamentals of Mobile and Pervasive Computing* by Frank Adelstein, Sandeep KS Gupta, Golden Richard III and Loren Schwiebert, McGraw-Hill Professional; 1st Edition (2004). ISBN-10: 0071412379.
4. *Fundamentals of Mobile and Pervasive Computing* by Golden Richard, McGraw-Hill Professional Publishing;December 2004.

SEN 334: Object Oriented Software Engineering

Credit Hours: 4
Prerequisites: CSC-210

Course Outline:

Introduction to Software Engineering, Modeling with UML, Project Organization and Communication, Requirements Elicitation, Analyses, System Design: Decomposing the System, System Design: Addressing Design Goals, Object Design: Reusing Pattern Solutions, Object Design: Specifying Interfaces, Mapping Models to Code, Testing, Rationale Management, Configuration Management, Project Management, Software Life Cycle, Methodologies: Putting It All Together.

Reference Materials:

1. *Object-Oriented Software Engineering: Using UML, Patterns, and Java*, Bernd Bruegge, Allen H. Dutoit, Prentice Hall, 2010 (or Latest Edition)
2. *Object-Oriented Software Construction*, Bertrand Meyer, 2nd Edition, Prentice Hall in 1997 (or Latest Edition)
2. *Formal Methods in Computing*, M. Ferenczi, and Andras Pataricza, Akademiai Kiao, 2005 (or Latest Edition)
3. *Code Complete: A practical handbook of software construction*, Microsoft Press, 2004. (or Latest Edition)

4. *Software Engineering*, Ian Sommerville, 8th edition, Addison & Wesley. 2006 (or Latest Edition)

SEN 326: Advanced Database Management Systems

Credit Hours: 3
Pre-requisites: CSC-220

Course Outline:

Overview of Databases Management Systems, Object-Oriented Databases, Object-Relational Databases, Mobile Databases, Temporal, Spatial Databases, Geographic Databases, Distributed Database Design, Distributed Multimedia Database Systems, Data Warehouse and OLAP Systems, XML Data Models, XML Documents and DTD, XML Query Languages, Advance Database Designing Techniques and Trends. Modeling Tools and Techniques for Advance Database Systems. Implementation and Applicationsof Advance Database Systems. Research Trends in database systems.

Reference Materials:

1. *Advanced Database Systems* by Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, Richard T. Snodgrass, V. S. Subrahmanian, Roberto Zicari, Morgan Kaufmann; 1st Edition (May 15, 1997). ISBN-10: 155860443X
2. *XQuery* by Priscilla Walmsley ISBN: 0596006349 *Spatial Databases: With Application to GIS* by Hilippe Rigaux. ISBN: 1558605886
3. *Advanced Database Systems* by Carlo Zaniolo, Stefano Ceri (Chapter 5,6)
4. *Foundations of Semantic Web Technologies* by Pascal Hitzler. ISBN:142009050X.

SEN 327: Distributed Database Systems

Credit Hours: 3
Prerequisites: CEN-222

Course Outline:

Distributed Data Processing, Distributed Database Systems: Architecture, General Systems Issues, Example Systems. Distributed Control for Synchronization and Concurrency (Will Include the Models for Concurrent Processing and Transactions, Theory of Serializability, Classes of Concurrency Control Approaches, Performance Evaluation of these Classes, Centralized Control vs. Decentralized Control). Distributed Commitment/Termination (Involves Preservation of Atomicity of Transaction Execution, Blocking/Non-Blocking Protocols). Resiliency in Distributed Systems (Involves Design of Protocols for Site Failure, Network Partitioning, Loss of Messages or Variable Transmission Delays, Consistent Recovery). Security in Distributed Systems. (Involves Study of a Variety of Attacks on the Components of System (Such as on Routing Protocols in Adhoc Networks), Privacy Issues in Peer to Peer Systems, Trusted Collaboration and Dissemination of Data Among Cooperative Entities). Design and Implementation of Prototype/Commercial Systems, Experimental Evaluations. Details of Peer to Peer System Developed at Purdue and Several Commercial Systems. Security Issues in DDBs. Latest developments and Research Trends in Distributed Databases.

Reference Materials:

1. Principles of Distributed Database Systems, M.T. Ozsu, P. Valduriez (eds.): (2nd Edition), Prentice Hall, 1999.
2. Transactional Information Systems, G. Weikum and G. Vossen, Morgan Kaufmann, 2002.

SEN 328: Game Application Development

Credit Hours: 3
Prerequisites: CSC-210

Course Outline:

History of Computer and Video Games, Game Design Principles, Python Programming, Pygame, Storytelling, Sprites and Animation, Game Development Methodologies, Physics, Loose Ends, Audio, Sound, and Music (PDF), 2D Game Group Project Check-In, Game Testing, Ethics, MMORPGs, and Securing Online Games, Game Engines, iOS Development, Cocos2D, Games in 2012 and Beyond

Reference Materials:

1. Agile Game Development with Scrum, by Clinton Keith (Addison-Wesley, 2010)
2. AI for Game Developers, by David Bourg and Glenn Seemann (O'Reilly Media, 2004)
3. The Art of Game Design: A Book of Lenses, by Jesse Schell (Morgan Kaufmann, 2008)
4. Fundamentals of Game Design, Second Edition, by Ernest Adams (New Riders, 2010).

SEN 330: Agent-based Computing

Credit Hours: 3
Prerequisites: None

Course Outline:

Introduction to Agent-based Computing, Agent-based Models, Modeling Complex Real-world Problems using Agents, Introduction to Net Logo, Describing ABMs, From Animation to Science, Model Verification & Validation, Model Design, Emergence, Observation, Adaptive Behaviour, Prediction, Software Multiagent Systems, Intelligent Agents, Deductive Reasoning Agents, Agent Methodologies. Introduction to Agent-based Models, Introduction to NetLogo, Describing ABMs, First ABM Development, Animation to Science, Model Verification & Validation, Emergence, Adaptive Behavior, Prediction, Cognitive AB Computing Framework, Complex Network Modeling, Exploratory AB Modeling, Descriptive AB Modeling, Validated AB Modeling.

Reference Materials:

1. Agent-Based and Individual-Based Modeling: A Practical Introduction by Steven F. Railsback and Volker Grimm, 2011 (latest ed.).
2. Managing Business Complexity: Discovering Strategic Solutions with Agent-Based Modeling and Simulation, Michael J. North and Charles M. Macal, 2007.

SEN 331: Scientific Computing

Credit Hours: 3 (2+1)
Prerequisites: GSC-110

Course Outline:

The concepts of efficiency, reliability and accuracy of a method; Minimising computational errors; Theory of Differences, Difference Operators, Difference Tables, Forward Differences, Backward Differences and Central Differences. Mathematical Preliminaries, Solution of Equations in one variable, Interpolation and Polynomial Approximation, Numerical Differentiation and Numerical Integration, Initial Value Problems for Ordinary Differential Equations, Direct Methods for Solving Linear Systems, Iterative Techniques

in Matrix Algebra, Solution of non-linear equations.

Reference Materials:

1. Numerical Methods in Scientific Computing by Germund, D. Åke, B.
2. Numerical Methods for Scientific Computing by J. H. Heinbockel.
3. Numerical Analysis by I. A. Khubaza.

SEN 329: Digital Animations

Credit Hours: 3
Prerequisites: None

Course Outline:

What is digital animation? digital animation Authoring Tools, digital animation Authoring, digital animation production, Multimedia Presentation, Automatic Authoring, Editing and Authoring Tools-(Proprietary/open Source), VRML, Making Multimedia: Handling Images, Sound, Animation and Video, Planning & Costing, Designing and Producing. Multimedia Skills and Talent, The Internet and digital animation. Designing for the World Wide Web. Delivering Multimedia Product. Instructors can devise a Lab work plan using a multimedia Authoring tool in line with the contents of the syllabus.

Reference Materials:

1. Multimedia Making It Work, 8th Edition by Tay Vaughan, McGraw-Hill Osborne Media; 8th Edition (October 29, 2010). ISBN-10: 0071748466
2. Fundamentals of Multimedia by Z. M. Li and M. S. Drew, Prentice Hall (2004), ISBN: 0-13-127256-X
3. Digital Multimedia by N. Chapman and J. Chapman. 2nd Edition, Wiley 2004, ISBN: 0-470-85890-7
4. The Technology of Video and Audio Streaming by David Austerberry, Focal Press; 2nd Edition (2004). ISBN-10: 0240805801
5. Multimedia Foundations: Core Concepts for Digital Design by Vic Costello, Ed Youngblood and Susan Youngblood, Focal Press; 1st Edition (2012). ISBN-10: 0240813944

Appendage 0910

Agenda Item 0910

Initiated by: Earth & Environmental Sciences, Islamabad Campus

SUBJECT: Launching of Doctor of Philosophy (PhD), Program in Geology,

Geophysics and Environmental Sciences

1. **Background to the case:**
   Since its inception in 2000, the student strength of the department has crossed the 1000 mark with more than 100 Master level students in geology, geophysics and environmental sciences. The department is of the opinion that it's the right time to start PhD programs in these disciplines. The department has six PhD faculty members, fulfilling the HEC'sfaculty requirement. The PhD programs in environmental sciences and geophysics have already been approved by the 12th and 14th academic council meetings (ACM) for Karachi campus. The department at Islamabad campus would follow the same road maps as that of the Karachi campus. Theproposed courses for the geology road map were discussed in detail, keeping in viewthe present research and industrial trends.The department will follow the HEC eligibility criteria for admission into these programs and conduct course and research work as per prescribed PG rules of Bahria University. This road map is presented here for further discussions and approval.

2. **Recommendations:** The initiation of PhD programs would raise the research standards and the number of publications would also increase. The department may please be allowedto start the PhD programs in the subject disciplines.

3. **Establishment/HR effects, if any:** After one year, a few more PhD faculty members will be required.

4. **Financial effects:** The University will lose the money, but will earn a good name amongst the universities. This may also help to achieve a better ranking.

Council Decision:

Action By:

Deadline (If any)

Appendage 0911

Agenda Item 0911

Initiated by: Earth & Environmental Sciences, Islamabad Campus

SUBJECT: **Curricula revision of BS and MS programs in Geology, Geophysics and Environmental Sciences**

1. **Background to the case:**

As per norms and HEC guidelines the department reviews curricula of its BS and MS programs every three years. Following changes are proposed, after feedback from faculty and concerned industry professionals.

2. **Recommendations:** The changes proposed my please be approved.

3. **Establishment/HR effects, if any:** NIL

4. **Financial effects:** NIL.

Council Decision:

Action By:

Deadline (If any)

Appendage 0912

Agenda Item 0912

Initiated by: Earth & Environmental Sciences, Islamabad Campus

SUBJECT:Revision of honorarium rates of BS thesis supervisor, co-supervisor and examiner.

1. **Background to the case:**

The present honorarium rates of supervisor, co-supervisor and examiner (for a group of three students) have notbeen revised for the last five years. The members of the committee were of theopinion that these rates need to be revised The present and proposed rates are given below.

S#	Title	Present Rates	Proposed Rates
1	Supervisor	5000	5000
2	Co-Supervisor	1000	2000
2	External Examiner	1000	2000

2. **Recommendations:** The Proposed rates may please be approved.
3. **Establishment/HR effects, if any:** NIL
4. **Financial effects:** Cost per group of students would increase by Rs. 2000

Council Decision:

Action By:

Deadline (If any)

Financial Effects

		(Rs. in M)
Number of Students	09	
Total Program (54 credit hours) fee	316,908x9	2.85
Payment against course teachings	9 crsx48hrsx3000	1.3
Payment to foreign evaluators (Thesis)	9x300, 000	2.7
External and Internal Examiners (Thesis)	9x10, 000	0.09
Hidden Expenses (Field+Lab) work	9x200, 000	1.8
Total Expenses		5.89
Loss		3.04

Bachelor of Science (BS) in Environmental Sciences (BS-ES)

ENV 445 "Grand viva voce" is added to 8th semester with zero credit allocation as per HEC road map.

GEO 305 "Environmental Geology" is shifted to 5th semester.

ENV 230 "Environmental Issues" is shifted to 3rd semester.

ENV 315 "Environmental Management system" the course title is changed to " Environmental Management"

HSS 202 "Introduction to Sociology" is replaced with HSS—"Introduction to Psychology" and shifted to 4th semester.

ENV 325 "Water Resource Management" is replaced by " Environmental Engineering" is shifted to 6th semester"

ENV 335 "Analytical Techniques in Environmental Sciences" is shifted to 5th semester.

ENV 345 "Environmental Hazards" the course title is changed to " Environmental Hazards and Management"

ENV 430 "Environmental Laws and Policies" the course title is changed to "Environmental Policies and Laws"

Bachelor of Science (BS) in Geology

CSC 205 "Programming Fundamentals" has been replaced with

CSC 205 "Fortran-4" in 3rd semester.

CSC 305 "Data Structures" has been replaced with

CSC 305 "Mat lab" in 5th semester.

GEO 340 "Well Logging" the title of the course has been changed to "Wire line logging"

GEO 465 "Comprehensive Oral Exam" has been added to 8th semester with zero credit allocation as per HEC road map.

Bachelor of Science (BS) in Geophysics

CSC 205 " Programming Fundamentals" is replaced with

CSC 205 "Fortran-4" in 3rd semester.

CSC 305 "Data Structures" is replaced with

CSC 305 "Mat lab" in 5th semester.

GEO 240 "Gravity and Magnetic Exploration Techniques" is sifted to 5th semester.

GEO 340 "Well Logging" the title of the course is changed to "Wire line logging"

GEO 465 "Comprehensive Oral Exam" is added to 8th semester with zero credit allocation as per HEC road map.

GEO 245 "Mathematical Methods of Physics" is deleted.

GEO 370 "Geomagnetism and Paleomagnetism" is shifted to 4th semester.

GEO 365 "Electrical and Radioactive Techniques" is shifted to 4th semester.

GEO 367 "Seismic Data acquisition and Planning" is added to 6th semester.

GEO 455 "Geophysical Data Processing" the name of the course is changed to " Seismic data processing" and shifted to 7th semester.

GEO 450 "Seismic Exploration Techniques" the title of the course is changed to "Seismic data interpretation Techniques" and shifted to 8th semester.

Masters of Science in Environmental Sciences (MS-ES)

ENV 505 " Environmental laws and Policies" the course title is changed to "Environmental Policies and Laws" as per HEC road map

ENV 540 "Grand viva voce" is added to the end of program with zero credit allocation as per HEC road map.

Masters of Science in Environmental Policy & Management (MS-EPM)

ENV 505 "Environmental laws and Policies" the course title is changed to "Environmental Policies and Laws"

ENV 520 "Solid and Hazardous Waste Management" the course title is changed to "SolidWaste Management" as all the solid waste is not hazardous.

ENV 538 "Statistical Analyses in Earth Sciences" is added to the elective list to enable students use statistical skills to better interpret the analytical data.

ENV 540 "Grand viva voce" is added to the end of program with zero credit allocation as per HEC road map.

Masters of Science (MS) in Geology

GEO 506 "Advanced Geochemistry" the course title is changed to "Hydrocarbon Geochemistry" to be hydrocarbon specific.

GEO 509 "Log analysis and Well Site Geology" the course title is changed to "Well Site Geology"

GEO 526 "Clay Mineralogy" the course title is changed to "Clay Mineralogy and Petrology"

GEO 545 "Petrophysical Analysis" is added to the elective list.

GEO 546 "Advanced Biostratigraphy" is added to the elective list.

GEO 550 "Comprehensive Oral Exam" is added to the end of program with zero credit allocation as per HEC road map.

The following courses are deleted from the elective's list as they are listed in the environmental sciences curriculum and can be selected directly from there.

ENV 523 "Climate Change" is deleted.

ENV522 "Natural Disaster Management" is deleted.

ENV 504 "Environmental Impact Assessment" is deleted.

ENV 537 "Environmental Engineering" is deleted.

Masters of Science (MS)in Geophysics

GEO 502 "Geophysical Exploration Methods" is deleted.

GEO 509 " Log analysis and Well Site Geology" the course title is changed to " Well Site Geology"

GEO 541 "Geophysical and Geological Software" is deleted.

GEO 513 " Reflection Seismology" the course title is changed to " Advanced Seismology"

GEO 530 "Advanced Marine Geology" is deleted.

GEO 545 "Petrophysical Analysis" is added to the elective list.

GEO 547 "Advanced Petroleum Engineering" is added to the elective list.

GEO 550 "Comprehensive Oral Exam" is added to the end of program with zero credit allocation as per HEC road map.

The following courses are deleted from the elective's list as they are listed in the environmental sciences curriculum and can be selected directly from there.

ENV 523 "Climate Change" is deleted.

ENV 504 "Environmental Impact Assessment" is deleted.

Appendage 0913

Agenda Item
0913

Initiated by: HOD EE, Karachi Campus

INCLUSION OF FYP GRADES IN EIGHT SEMESTER CGPA CALCULATION.

1. **Background**

- Students in Engineering programs mandatorily register for final year projects (ESC-448 and ESC 449) in 7th and 8th semester respectively. However their grades are cumulated in 8th semester when they finish their projects sufficiently.
- It has been observed that students got expulsion from Bachelor program due to less CGPA or probation in their 8th semester even they have completed their FYP project successfully.
- This is also partial as the time and money has been invested by the students during the whole semester.

2. **Recommendation**

- FYP projects should be evaluated in two semester i.e., semester 7 and 8. Students in probation or chance can improve themselves with this segregation.
- In addition to this final year CGPA calculation must include FYP result.

3. **Establishments/HR Effect if any**

NIL

4. **Financial Effect**

NIL

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Appendage 0914

Agenda Item
0914

Initiated by: HOD EE, Karachi Campus

AVAILABILITY OF PAST EXAM PAPERS IN LIBRARY

1. **Background**

 At the moment, past exam papers either mid or final terms are not made available for BU students.
 Almost all universities give provision to students that past exam papers are kept in library database or made available online.
 This activity will reflect towards improvement of exam papers quality.

2. **Recommendation**

 This point was discussed in DBOS and after thorough discussion it is recommended to FBOS for debate.
 Each academic department will decide which of its exam papers are made available from examination department.

3. **Establishments/HR Effect if any**

NIL.

4. **Financial Effect**

NIL.

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Appendage 0915

Agenda Item
0915

Initiated by: HOD EE, Karachi Campus

WEIGHTAGE OF CANDIDATE'S INTE RVIEW IN ADMISSION PROCESS .

1. **Background**
   - It has been noticed, that students strongly rejected by interview committee get admission in engineering programs due to the absence of interview factor metric in final merit list.
   - In spite of their high percentage in intermediate examination, they were unable to give answers of basic question and failed to produce simple LCM and algebra problems.
   - This situation put a severe question on our rational examination system and subsequently increased students our drop out ratio.
   - Our accreditation bodies are also showed concern over high dropout ratio in BEE program.

2. **Recommendation**

   - Proposal for 15% weightage in interview is recommended for admission in engineering program while reducing the assigning ratio of intermediate result.
   - Furthermore, it can be mandatory to qualify the interview for final selection by attaining minimum 50% marks.

3. **Establishments/HR Effect if any**

NIL.

4. **Financial Effect**

NIL.

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Appendage 0916

Agenda Item
0916

Initiated by: HOD EE, Karachi Campus

REMUNERATION FOR INTERNAL EXAMINER IN MS/PHD PROGRAM.

1. Background

- Currently, there is no provision of any remuneration for internal examiner who assess MS/MPhil Thesis
- The assessment requires thorough evaluation and repetitive analysis which is time consuming and need extra efforts for quality improvement.
- To enhance motivation some reasonable amount can be awarded for internal examiner as well.

Recommendation

2. This point was discussed in DBOS and after deliberation it is proposed to FBOS for further discussion.
3. For internal examiner, payment of 5000 for MS and 10000 rupees for PhD is recommended for thesis/dissertation evaluation.

4. Establishments/HR Effect if any

NIL.

5. Financial Effect

Applied

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Appendage 0917

Agenda Item
0917

Initiated by: HOD EE, Karachi Campus

ADDITION OF AN ELECTIVE COURSE IN MSEE PROGRAM

1. Background

- A new elective course " EEX 781 **Research Study on special topic**" for MSEE program is proposed for thesis students to gain experience in almost any field in which they are interested for research.
- Supervised by an advisor special studies are taught on an individual basis and must include a project report.
- A research study should be completed in exactly the same way as other courses taken in a given semester but should be supervised and graded by a student's Program Committee.

2. Recommendation

- This elective course will help graduate research students to complete their program of study in due course of time.
- DBOS has recommended inclusion of this elective in MSEE roadmap.

3. Establishments/HR Effect if any

NIL.

4. Financial Effect

NIL.

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Appendage 0917

Agenda Item
0917

Initiated by: HOD EE, Karachi Campus

REVISED ROADMAP AND CURRICULUM FOR MSEE PROGRAM.

5. Background

- Bahria University is offering MSEE program since Fall 2011 in four different categories of specialization.
- With passage of time, it has been pertinent to revise and update the MSEE roadmap and curriculum in order to make pace synchronize with the current and future trends.
- Keeping in view, a committee was formulated in the department and various aspects like credit hours, various streams, list of core and elective courses were analyzed in order to make MSEE program comprehensive with efficient contributions to emerging industry standards.

6. Recommendation

- The modified roadmap with list of core/electives subjects for MSEE programs in Electrical Engineering in different specializations is given below.
- The curriculum/ syllabus is forwarded to FBOS for approval and further deiberation.

7. Establishments/HR Effect if any

NIL.

8. Financial Effect

NIL.

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

Road Map 2015 and Revised Curriculum

MS Electrical Engineering Program

Bahria University Pakistan

MS Electrical Engineering (MSEE) program

1. Program Mission

The mission of the Electrical Engineering Department is to provide quality education to prepare students who will play a significant role in shaping the future high technology environment, and to provide knowledge and skills to foster lifelong learning.

EE Department's vision is to cultivate strategic alliance and partnership with major industries in the region & promote technology venture and entrepreneur leadership.

2. Objectives

The objective of Master of Science in Electrical Engineering Program is to enhance the student's ability to be successful and advance in their chosen fields in industry, academia and public institution, and to make significant contribution to the field of electrical engineering. The program leading to the MSEE degree provides intensive preparation for professional practice in a broad spectrum of high-technology areas of electrical engineering.

3. MSEE (2 Years Program)

The 30 credit hour MSEE program is concerned with efficient contributions to emerging industry standards and development of competitive knowledge of Engineering.

Important motivations like collaboration between circuits and power systems as well as the design of intelligent power networks, where signal processing and communication advancement is applied to efficient energy distribution, are some clear advantages.

The combination of devices, circuits, systems and algorithms, applied to power systems, gives to EE a consistent front of interlaced technologies. The major fields of specialization are Telecommunication, Power Systems, Computer & Electronics Design and Automation & Control systems.

3.1.1. Eligibility Criteria:

* Bachelor of Science in Electrical Engineering or related disciplines from an accredited institution with minimum CGPA of 2.5 out of 4.0.

* Graduates from other engineering disciplines or 16-year degree in Computer Science, Electronics, Physics or any related discipline may be eligible for this program, subject to passing the prerequisite courses with minimum GPA 3.0 of 4.0 in each course, as recommended by the departmental graduate committee at admission time.

4. MSEE Specializations:

MS in Electrical Engineering (MSEE) includes the following specializations or major areas:

- Telecommunications
- Computer and Digital Systems
- Automation and Control
- Power Systems

4.1. Telecommunications:

The MS in Telecommunication aims to provide students with a sound background in techniques and issues of modern communication system particularly the wireless and internet communications. It derives its uniqueness from the research activities of the communication and signal processing research groups of the department of Electronics; providing students with a complete picture of modern communication technology as well as a thorough theoretical and practical knowledge of radio communication techniques, signal processing, network protocols, and the design and optimization of communication networks.

MS Research projects cover a range of applications in areas of:

- Wireless networks
- Future generation communication technologies
- Error control coding
- Digital signal and image processing
- Biometrics identification and authentication

4.2. Computer and Digital Systems:

The MS in Computer and Digital Systems provides a solid theoretical background of the digital devices, tools, data networks, operating system as well as hands on experience with the techniques used in modern digital system design using FPGAs as hardware platform and VHDL as digital design language. It aims to provide knowledge of the industry standard tools to make students natural contenders for prospective employers. The specialization in this area is to develop a comprehensive understanding of the hardware and software technologies used in computing systems.

4.3. Automation and Control:

The MS in automation and control specialization aims to provide the graduates with sound engineering knowledge and broad professional skills to design, develop, implement, manage and supervise automation systems for different engineering applications. This course covers all the major disciplines in automation and control. It includes a thorough analysis of advanced control systems, industrial automation technologies, systems integration, distributed control systems and field bus protocols. This course provides an ideal platform to begin a career as a design or development engineer in control and automated systems

4.4.Power Systems:

The MS in power system engineering aims to provide students with theoretical and practical skills to become a design and development engineer in the area of electrical power engineering. Throughout the program students shall be exposed to industry standard computer aided software design tool and packages such as MagNet, MATLAB, Simulink, PSpice and ERACS to afford them a more hands on approach that shall leave them more attractive for prospective employers. The course develops a sound knowledge in the key subject areas of:

- Electrical Machines
- Electrical Power
- Power Electronics
- State Space Analysis and Controller Design
- Control of Electric Drives
- Design of Modern Electrical Machines and Drives
- Renewable energy
- Smart grids

5. MS Program Requirements and Structure:

The MS Electrical Engineering program requirement is 30 credit hours. The students have two options to complete their degree, Thesis and Non-Thesis.

1.1 **Thesis Option (MS by Research):** The requirement is minimum 21 credit hours of course work and 9 credit hours of thesis involving research work.

1.2 **Non-Thesis Option (MS by Course work):** The requirement is minimum 30 credit hours of course work.

5.1.Semester Roadmap for MSEE (MS by Research)

Semester – I

i.	EEN 510	Stochastic Processes (Core-I)
ii.		Core – II
…		Elective – I

Semester – II

i.		Core-III
ii.		Core – IV
iii.		Elective - II

Semester – III

i.	ESC 501	Research Methodology (Core-V)
ii.	EEX 781	(Research Study *) Elective III

Semester – IV

i.	ESC 500	Thesis **

* As approved in advance by the graduate advisor after completion of 18 credit hours course work with sufficient CGPA.
** Thesis contains 6 credit hours.

5.2. Semester Roadmap for MSEE (Course work)

Semester – I			**Semester – II**		
i.	EEN 501	Stochastic Processes (Core-I)	i.		Core-III
ii.		Core – II	ii.		Core – IV
iii.		Elective – I	iii.		Elective - II
Semester – III			**Semester – IV**		
i.	ESC 501	Research Methodology (Core V)	i.		Elective IV
ii.		Elective-III	ii.		Elective V

Research Methodology which is university requirement is proposed as core course in modified MSEE roadmap.

LIST OF COURSES

The Core and Elective courses of all three specializations are listed below. It is mandatory to pass all the core courses mentioned in the roadmap and offered for respective domain.

6. Telecommunications

6.1. Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	ESC 501	Research Methodology	3
2.	EEN 510	Stochastic Processes	3
3.	EET 553	Information Theory and Coding	3
4.	EET 711	Digital Communications Systems	3
5.	EEN 725	Advanced Digital Signal Processing	3
6.	EET 555	Wireless and Mobile Communications	3

6.2. List of Elective Courses

Sr. No.	Course Code	Course Title	Credit Hours
1.	EET766	RF System Engineering and Design	3
2.	EET 750	Antennas Theory, Design and Applications	3
3.	EET 447	Radar Systems	3
4.	EET 449	Satellite Communications	3
5.	EET 755	Wireless Communication Techniques	3
6.	EEN 740	Embedded System Design for Telecommunications	3
7.	EET 756	Telecommunication Switching Systems	3
8.	EET 560	Telecommunication Network Management	3
9.	EET 706	Advanced Optical Fiber Networks	3
10.	EET 762	Communication Networks Arch and Protocols	3
11.	EET 764	Queuing Theory for Performance Modeling	3
12.	EET 554	Wireless Networks	3
13.	EET 548	Mobile Cellular Systems and Standards	3
14.	EET 850	Wireless Sensor Networks	3
15.	EET 701	Telecommunication Software Design	3
16.	EET 757	Mobile Computing	3
17.	EET 552	Multimedia Networking	3
18.	EET 754	QoS Arch for Multimedia Wireless Networks	3
19.	ESC 501	Research Methodologies	3
20.	CEN 745	Advanced Digital Image Processing	3

21.	EEX 600	Research Study on Special Topic	3

6.3.Removed Modules:

1.	EET 766	RF System Engineering and Design same as RF and Microwave Engineering(EEN 431)	3
2.	EET 522	Communication System Design and Analysis	3
3.	EET 504	Wireless LANs same as Wireless Networks	3
4.	EET 548	Mobile Cellular Systems and Standards similar as Mobile Communication system	3

7. Computer and Digital Systems

7.1.Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	ESC-501	Research Methodology	3
2.	EEN 510	Stochastic Systems	3
3.	CSC 502	Information Systems	3
4.	CEN 720	Advanced Computer Architecture	3
5.	CEN 742	Advanced Digital System Design	3
6.	CEN 740	Embedded Systems	3

7.2.Elective Courses

Sr. No.	Course Code	Elective Course Title	Credit Hours
1.	CEN 721	Advanced Microprocessor Systems	3
2.	CEN 541	ASIC and FPGA Design	3
3.	CSC 720	Advanced Operating Systems	3
4.	CEN 755	Parallel Processing Computer Systems	3
5.	CEN 752	Advanced VLSI System Design	3
6.	CEN 553	Real Time Computer Systems	3
7.	EEN 727	DSP Systems Design	3
8.		DSP Software Systems Design	3
9.	CEN 753	Design of Real Time Embedded Systems	3
10.	CSC 523	Compiler Design	3
11.	CEN 542	Embedded Software and RTOS	3
12.	CEN 739	Embedded Computing Systems	3
13.	EEA 702	Advanced Topics in Control Systems	3

14.	EET 704	Advanced Topics in Information Systems	3
15.	EEX 600	Research Study on Special Topic	3

7.3.Module Removed:

1	CEN 521	Microprocessor/Microcontroller Based Systems same as Advanced Microprocessor Systems(CEN 721)	3
2		DSP Software Systems Design same as DSP system Design (EEN 727)	3
3	CEN 553	Real Time Computer Systems(duplication)	3
4	ESC 501	Research Methodologies; university requirement suggested as core course for all courses of Electronics department.	3

8. Automation and Control

8.1.Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	ESC-501	Research Methodology	3
2.	EEN 510	Stochastic Systems	3
3.	CSC 502	Information Systems	3
4.	EEN 524	Electronic Design and Analysis	3
5.	EEN 726	Modern Control Theory	3
6.	EEN 725	Advanced Digital Signal Processing	3

8.2.Elective Courses

Sr. No.	Course Code	Elective Course Title	Credit Hours
1.	EEP 712	Advanced Power Electronics	3
2.	EEA 713	Robust Multivariable Control system	3
3.	EEN 523	Electronic Instruments	3
4.	CEN 507	Embedded Control System	3
5.	EEN 509	Non-Linear Control Systems	3
6.	EEN 506	Solid State Devices	3
7.	CEN 508	Distributed Control Systems	3
8.	CEN 758	Robotics and Intelligent sensors	3
9.	CSC 749	Fuzzy Logic and Intelligent Electronics Control Systems	3
10.	EEA 430	Mechatronics	3

11.	CEN 722	Advanced Interfacing Techniques	3
12.	EEA 741	Advanced Topic in Industrial Automation	3
22.	EEX 600	Research Study on Special Topic	3

8.3.Modules Removed:

1.	EEN 506	Solid State Devices ;undergraduate course not relevant	3

9. Power Systems

9.1.Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	ESC-501	Research Methodology	3
2.	EEN 510	Stochastic Systems	3
3.	EEP 514	Renewable Energy	3
4.	EEP 502	Advanced Power System Operation and Control	3
5.	EEP 558	Power Transmission and Distribution	3
6.	EEP 559	Power Generation and Plant Operation	3

9.2.Elective Courses

Sr. No.	Course Code	Elective Course Title	Credit Hours
1.	EEP 716	Advanced Power System Analysis	3
2.	EEP 558	Power Transmission and Distribution	3
3.	EEP 717	Advanced Power System Planning	3
4.	EEP 718	Advanced Power System Protection	3
5.	EEP 561	High Voltage Engineering Design	3
6.	EEP 754	Smart Grid System Operation	3
7.	EEP 521	Design of Electrical Machines	3
8.	EEP 564	Hydel Power Generation	3
9.	EEP 565	Integration of Distributed Generation	3
10.	EEP 566	Power System Reliability	3
11.	EEP 719	Advanced Topics in Power Systems Engineering	3
12.	EEP 514	Renewable Energy	3
13.	EEP 757	Non-Conventional Energy Systems	3
14.	EEP 516	Solar Power Generation	3
15.	EEP 517	Wind Power Generation	3
16.	EEP 519	Hybrid Power Systems	3

17.	EEP 714	Advanced Topics in Renewable Energy	3
18.	EEP 723	Thermal and Nuclear Power Generation	3
19.	EEP 720	Computer Methods in Power Systems	3
20.	EEP 721	Insulation Co-ordination in Power Systems	3
21.	EEP716	Advanced Power Electronics	3
22.		Solid State Drives	3
1.	EEX 600	Research Study on Special Topic	3

9.3.Modules Removed:

1.	EEP 512	Power Electronics Design same as advanced Power Electronics EEP716	3
2.		Renewable Energy Technologies same as Renewable Energy EEP 514	3
3.	EEP 520	Photovoltaic System Design same as Solar Power generation EEP 516	3
4.	EEP 518	Sustainable Energy Systems	3
5.	EEP 501	Research Methodologies	3

Appendage 0918

Agenda Item 0918

Initiated by: HoD(EE), Islamabad Campus

Subject:

Recommendations for signing MOU for split PhD degree program with University of Malaya Kuala Lumpur.

Background to the Case

Proposal FCP office of Bahria University:

a.The split PhD arrangement proposed by University of Malaya is relevant to Engineering Sciences only.
b. The university of Malaya would work on a PhD arrangement where the students would be recruited by Bahria University and study for most part of studies in Pakistan and be required to visit UM for a year only, no matter which year the student spends in University of Malaya.The only constraint is ,candidate needs to complete a research methodology course in the early period of program.
c. The degree will be awarded by University of Malaya. Bahria University may also award its own degree to the student, if the student is meeting the degree requirement of Bahria University.
d. The tuition fee rates specified in the agreement totals to US$7,100, payable to university of Malaya. Bahria University may charge its own fee on the top of that as agreed with university of Malaya.
e. Bahria University would be required to recruit minimum of 10 students in an year for this arrangement.
f. Each institute will appoint a supervisor for the student.
g. Bahria university shall be required to make available its resources and labs to the students while their studies in Bahria university.
h. University of Malaya if required may send their faculty members to Bahria university for supervision or teaching purposes at their own expanse.

Financial Effect

- US $ 7,100 ,payable to UM, air fare and living expenses at fixed rate.

Recommendation

- HEC may be approached before initiating any split degree PhD Program.
- The condition of 10 students per year should be reduce to 5 per year.
- Option should be offered to own faculty members with proper legal commitments of serving BU for five years.
- Living expenses, air fare and tuition fee of faculty members shall be borne by Bahria

University. **<u>Establishment / HR Effect if any</u>**
DISCUSSION
Council Decision: **Action By:** **Deadline (if any):**

Appendage 0919

Agenda Item 0919

Initiated by: HoD(EE), Islamabad Campus

Subject:

To introduce the concept of Adjunct faculty in Bahria University.

Background to the Case

1. Currently there is no adjunct faculty in Bahria University.
2. Introducing the concept of Adjunct faculty will both benefit the administration at Bahria and the students.
3. Many other universities like NUST-SEECS, CASE, UET hire professionals as adjunct faculty to supervise their Grad students which benefits their research profile as well as help them in attracting high achievers to study at their institutes
4. Currently Bahria has very strong research groups with many publications and on-going research; but some of the groups need PhDs to help the group focus on common goals as well as bring individual interests to an understanding of mutual benefits.
5. .By hiring professionals as adjunct faculty Bahria can satisfy the needs of its faculty members and will also be able to attract good students at Ph.D. level.

Work load:

One course/ semester or Two courses/year.

Honorarium:

Rs 20K – 40K/month.
Research incentives as per BU policy.

Financial Effect 20K-40K/ month

Recommendations:

- Adjunct faculty is beneficial for BU,faculty, students and industrial professionals.
- Hiring professionals as adjunct, faculty Bahria University will be able to attract good students at PhD level.
- Adjunct faculty will help strengthen the ties between Bahria University and industry.
- The members will bring updated industrial knowledge to the class.

Establishment / HR Effect if any

Working paper attached

DISCUSSION

Council Decision:

Action By:

Deadline (if any):

ADJUNCT FACULTY:

Introducing the concept of Adjunct faculty will both benefit the administration at Bahria and the students. Many other universities like NUST-SEECS, CASE, UET hire professionals as adjunct faculty to supervise their Grad students which benefits their research profile as well as help them in attracting high achievers to study at their institutes. By hiring professionals as adjunct faculty Bahria can satisfy the needs of its faculty members and will also be able to attract good students at Ph.D. level. Bringing in Adjunct Faculty will also help strengthen the ties between Bahria and industry; the members will bring updated industrial knowledge to the class. By offering them the same honorarium as Bahria offers to visiting faculty; Bahria can open ways to improve its standards in one more dimension.

Adjunct faculty, also known as part-time or contingent instructors, They are usually hired to fulfill specific university needs, like temporary boosts in enrollments or student interest in particular electives, and as such, their contracts are designed to be flexible and are subject to change at any time. One of the most common reasons to hire adjunct faculty is to supplement existing teaching staff in the short term. Some adjuncts are not even academics at all, as is the case with subject matter experts and industry professionals. The option to adjunct is often ideal in these situations, as students can benefit from the person's expertise without expecting those experts to give up their regular jobs.

Difference from Visiting Faculty:

Visiting faculty is only paid for the number of hours they teach a course and the honorarium varies based on the experience and the level (Under-grad/ Graduate) they are teaching. Their performance is only based upon the feedback of the students and the assessment of the respective HODs. The adjunct faculty is specifically hired at Graduate level. Although they can be hired for undergrad students in which case they can supervise FYP in addition to their responsibility of teaching a course. But hiring them for Master's and Ph.D. the interested students can benefit as their research profiles as well as the research profile of Bahria university will improve. And it will help Bahria in attracting high achievers to study at their institute.

The contract of an adjunct faculty can be designed as to supervise a Ph.D. student and/ or teach one or two courses at Master's or Ph.D. level. Their contract can vary depending upon the needs of the university and it can be terminated/ changed as required.

Model in Other Universities:

Most of other universities in Pakistan hire adjunct faculty from time to time; as the need arises. NUST SEECS has faculty working in three different capacities- permanent faculty, regular visiting faculty, temporary visiting faculty. The Idea of regular visiting faculty is somewhat like the adjunct faculty with a little difference in the work load. FAST, COMSATS, Air University Islamabad, Hamdard University Karachi and CASE Islamabad hire Adjunct faculty members who teach a course load of 1 or 2 courses per year in addition to supervising MS and Ph.D. students. Their contracts are renewed every year as long as they can bring individual interests to an understanding of mutual benefits for the University, its students and the research profile. In

definition Adjunct faculty works part time and is allowed a course load of minimum 1 and maximum 3 courses per year, the courses are usually of master's and Ph.D. level. In addition to that they can work in the capacity of a supervisor for master's and/or Ph.D students. Honorarium is usually dependent upon number of courses and number of students registered for MS and/or PH.D. The pay is usually some amount dependent upon the experience, qualifications and expertise of the applicant; which is paid as lump sum per year. It can also be paid per month.

Although it is still a relatively new concept but building on international standards and HEC's regulation.

HEC regulations regarding adjunct faculty:

The following points were noted from the data collected from HEC website regarding adjunct faculty.

1. Dr.Masoom YaseenZai, Dr.Saeeda Asadullah and Dr.Iqrar Ahmed supported the idea to allow PhD Supervisors from outside the University. Dr.Sohail Naqvi further elaborated the international practices and suggested that a person working in a recognized research Institute, in the same city, recognized by the University as adjunct faculty only then he/she may be allowed to become a PhD Supervisor [1]
2. Part time faculty or researchers are required to become Adjunct Faculty and need letter from head of University or DAIs confirming their appointment for becoming a PhD approved Supervisor.
3. The present HEC approved supervisors if fall in the category of part time faculty or researchers will be asked to get the letter of appointment as Adjunct Faculty from the Universities concerned within next one year [2]

References:

1. MINUTES OF THE 16th MEETING OF NATIONAL QUALITY ASSURANCE COMMITTEE (NQAC) available at

   http://www.hec.gov.pk/InsideHEC/Divisions/QALI/QADivision/Documents/Minutes%20of%2016th%20Meeting%20of%20NQAC%2024-12-09.pdf
2. MINUTES OF THE 17th MEETING OF NATIONAL QUALITY ASSURANCE COMMITTEE (NQAC) available at
   http://www.hec.gov.pk/InsideHEC/Divisions/QALI/QADivision/Documents/Minutes%20of%2017th%20Meeting%20of%20NQAC%20.pdf