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### **Confirmation of the Minutes of the 25<sup>th</sup> ACM**

1. Draft minutes of the 25<sup>th</sup> ACM were communicated to all members for comments, on 22<sup>nd</sup> Oct 2015; none were received. Approved minutes were then issued on 28<sup>th</sup> Oct 2015. No observations or comments have been received till issuing of this document. The Council may, therefore, confirm the minutes of the 25<sup>th</sup> ACM.

### **Discussion & Decision**

## Review Items

### **Item 2009: Commencement of Indigenous PG Programmes (MPhil & PhD) in Basic Health Sciences**

Responsibility: DGBUMDC

#### **Decision of the 25<sup>th</sup> ACM**

2. Progress on all aspects of the case to be reported. PG Rules to be formulated.

#### **Progress reported by Principal BUMDC**

3. Following progress has been made in the regard of MPhil program going to be start in Basic Science Departments including Anatomy, Physiology, Biochemistry, Pathology, and Pharmacology:
  - a. Multidisciplinary lab is established with its fully functional molecular biology unit and analytical center with sample storage room.
  - b. Prospectus for MPhil program of Anatomy, Physiology, Biochemistry, Pathology and Pharmacology have been prepared and submitted PMDC and ORIC through Director Health Sciences.
  - c. A separate Post Graduate rules & regulation has been made by doing revision in Bahria Statutes to be incorporated in academic rule of BUMDC as medical entity.
  - d. PMDC inspection has been successfully conducted for MPhil program in Basic Sciences Departments including Anatomy, Pathology, and Pharmacology and got verbal approval (Latter awaited). Inspection of Biochemistry and Physiology is expected in coming days for which remainder have been sent to PMDC.
  - e. PG committee and PG admission committee has been formulated and two meeting have been organized to discuss and approve following agenda point.
    - Criteria of MPhil Supervisors
    - Entrance Test Curriculum
    - Distribution of core courses
    - Admission criteria

#### **Recommendation**

4. The point may remain on the agenda and progress reported.

#### **Discussion & Decision**

**Item 2015: Commencement of Professional Psychology Programme at the BUIC**

Responsibility: DIC

**Decision of the 25<sup>th</sup> ACM**

5. Progress to be reported.

**Progress reported by HOD PP**

- a. The purchase of required psychological test is completed for lab.
- b. MOU with 3 hospitals are already signed while the efforts are in hand to make an arrangement at PNS Hafeez since the official permission from naval authorities has been granted for up-gradation of hospital.
- c. Students of MS have been assigned to 3 faculty members for their thesis, while 3 students are being supervised by External Supervisors. Therefore, the requirement of supervision is fulfilled currently.

**Recommendation**

6. The point may remain on the agenda and progress reported until the first batch graduates.

**Discussion & Decision**

**Item 2206: New Roadmaps for BBA and MBA Programmes**

Responsibility: Dean(M&SS)

**Decision of the 25<sup>th</sup> ACM**

7. The Committee formed by the Dean(M&SS) to revamp the BBA and MBA curricula is to present its report at an inter-campus VLC by end-Nov. Revised BBA and MBA curricula are to be introduced wef the Spring 2016 batches.

**Progress reported by Dean M&SS**

8. Roadmap got approved by the competent authority. Will be submitted before the forthcoming ACM for ratification.

**Progress reported by DKC**

9. New curriculum approved by Rector and will be presented by Dean MS&SS before ACM for ratification.

**Recommendation**

10. Decision may be taken in the light of the presentation to be made by the Dean M&SS.

**Discussion & Decision**

**Item 2234: Bahria University Lahore Campus – Progress Report**

Responsibility: DLC

**Decision of the 25<sup>th</sup> ACM**

11.
  - a. 5% relaxation in admission criterion approved for the BBA and BS(IT) programmes at the BULC, for the Spring 2016 admissions.
  - b. Students availing the relaxation shall not be permitted transfer to the BUIC or BUKC.
  - c. Progress on all aspects of the Campus be reported.

**Progress reported by DLC**12. Civil Works.

- a. Rs.28M have been allocated for BULC to undertake urgent work/ jobs. Details are as under:-
  - (1) Air-conditioning, Audio System & Auditorium chairs/modular stage / partition of Multi-purpose Hall. Completed.
  - (2) Provision of Generators:-
    - (a) 200 KVA Completed
    - (b) 50 KVA Re-tendered after the supplier (M/s Jaffer Brothers was un-able to provide the equipment as specified in the tender document).
- b. Construction of additional floor is essential prior admissions of Fall-2016. Case under deliberation with Bahria Foundation at BUHQ.

13. Admissions.

- a. 5% Waiver in Admission Criteria: 5% Waiver in Admission Criteria for BBA & BSIT granted for the spring 2016 admissions were availed as under:

Program	No. of Students Availed Waiver	Total Class Strength	% of Students Availing Waiver
BBA	03	13	23.07%
BSIT	06	34	17.64%

- b. A number of universities and institutions at Lahore exercised 45% eligibility criteria for BBA and BSIT programs. Importantly, analysis of admissions Spring-2016 reveals that 17.64% entrants availed 5% waiver in BSIT and 23.07% in BBA programs. BULC may be allowed to use the facility of 5% waiver in Fall-2016 admissions of BBA and BSIT programs, as well.
- c. Admissions campaign for Spring 2016. Completed

14. Academics.

- a. DLD Lab: Completed
- b. Establishment of new computer lab. Completed.
- c. Case for PhD program forwarded to HEC through BUHQ. HEC approval awaited.
- d. Formation of CAC's and holding of CAC's meeting by MS and CS&IT Departments. Completed.



- e. Hiring of 3rd PhD in MS Department to commence PhD Program. Completed.
- f. Following Programs cleared from FBOS for presentation in 26th ACM:
  - (1) MS in Supply Chain Management
  - (2) Introduction of Psychology Department.
- g. BS-Bioinformatics as approved vide 24th ACM will be launched subsequent to construction of 01 additional floor.
- h. Case for NOC for the MSCS program forwarded to HEC through BUHQ. HEC approval awaited.

#### **Recommendation**

15. The point may remain on the agenda and progress reported. The Council may respond favourably to the following requests made by the Campus:

- a. 5% waiver to the admission criterion for the Fall 2016 admissions.
- b. Construction of additional floor.

#### **Discussion & Decision**

**Item 2301: MS Engineering Management at BUIC - Launch Proposal**

Responsibility: DIC

**Decision of the 25<sup>th</sup> ACM**

16. HEC's approval to the programme be pursued continuously and progress reported

**Progress reported by DIC**

17. MS (EM) is being offered w.e.f. Spring 2016 Semester after having received the HEC approval.

**Progress reported by HOD(SE)IC**

18. Approval was granted by HEC. Approval on file was obtained from honorable Rector, supplementary advertisement was placed and a class of 13 students was formed which is currently in progress in first semester.

**Recommendation**

19. The point may be dropped.

**Discussion & Decision**

**Item 2302: MS Computer Engineering (Evening) at BUIC - Launch Proposal**

Responsibility: DIC

**Decision of the 25<sup>th</sup> ACM**

20. Marketing efforts be made to improve induction into the programme and progress be reported.

**Progress reported by DIC**

21. MS (CE) program has been launched and there are 6 students currently enrolled in the program containing some bright students including one with a CGPA of 4.0/4.0.

**Recommendation**

22. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2304: BS Accounting & Finance at BUIC - Launch Proposal**

Responsibility: Dean(M&SS)

**Decision of the 25<sup>th</sup> ACM**

23. BS(Accounting & Finance) curriculum at the BUIC is to be aligned with the ICAP's before the Spring 2016 admissions. Progress to be reported.

**Progress reported by Dean M&SS**

24. BS(Accounting & Finance) curriculum at the BUIC has been aligned with the ICAP's. Spring 2016 admissions held accordingly.

25. Program was started in Fall 2015 with intake of 36 students. Presently there are 69 students with the following breakup:

Semester 1: 45

Semester 2: 24

Dropped/transferred: 12

26. Collaboration with ICAP has already been materialized. According to the collaboration our graduates will be entitled to exemptions of 8 papers in the enrolment of CA. Post collaboration visit of ICAP has been planned in the third week of March 2016. However, Collaboration process with ACCA has already been initiated to get exemption in ACCA certification.

**Recommendation**

27. The point may be dropped as sufficiently promulgated and actioned.

**Discussion & Decision**

**Item 2331: Reforming the Academic Audit system of BU**

Responsibility: DNCMPR, DIC, DKC, DLC, DQA, DIPP

**Decision of the 25<sup>th</sup> ACM**

28. a. The tripartite audit model is to be amplified. The model shall be formalized into a handbook, to be titled “Academic Audit Policy”. The handbook shall articulate the audit regime for easy and clear understanding and implementation.
- b. Departmental Self-Audits shall be carried out every semester. HODs shall be at liberty to add any audit parameters they wish to add. Self-Audit reports shall be submitted to the Director Campus. Director Campus shall endorse his considered comments on the reports and forward them to the DQA. The Dept shall follow up the Self-Audit with an Action Plan to fix the gaps.
- c. Audit formats shall be standardized.
- d. Composition of the Mock Audit teams shall be internal only; the respective Dean shall head the Mock Audit teams.
- e. Periodic Self-Assessment under the HEC’s QAA model shall continue.
- f. Departments shall be ready for academic audits at short notice.
- g. These decisions shall be considered adjunct to the ACM Decision 24(2331).

**Progress reported by DQA**

29. A handbook titled “BU Academic Audit Policy” has been prepared and forwarded to concerned stakeholders for views/comments with the consent of Competent Authority. The draft will be finalized /processed for approval after incorporation of input received if any. (DQA)
30. A chapter on ‘Articulation of QA Functions’ duly approved by Rector is being included in BU Academic Rules. The chapter contains BU QA Functions, procedures for Self-Assessment, Mock Audit and Self Audits.
31. Deans of respective faculties headed all the Mock Audit so far conducted for preparation of accreditation bodies visit for accreditation/re-accreditation.
32. The same function has been also included in chapter on ‘Articulation of QA Functions’.

**Progress reported by Campuses**

33. Point noted for implementation. (BULC)
34. Point noted for compliance. (BUKC)
35. BUIC.
- a. Decision of tripartite audit system has been communicated to all faculty members so that they can maintain all the documents, folders and other necessary artifacts. Departmental audit of courses has also been conducted.
- b. Self-Audit reports will be submitted as directed.

- c. Periodic Self-assessment Report under the HEC's QAA model is being continued.
- d. All the departments are ready for Academic Audit.

**Recommendation**

36. The point may be dropped as sufficiently promulgated. Progress on the Audit Handbook may remain on the agenda.

**Discussion & Decision**

**Item 2334: BBA and MBA Programmes - Reforms in the Course Outlines in line with the Heuristic method of Teaching and the corresponding Evaluation Techniques**

Responsibility: Dean(M&SS)

**Decision of the 25<sup>th</sup> ACM**

37. Faculty of Management Sciences to strategise the recommendations of the Committee on Heuristic Method into an Action Plan with top priority given to the aspect of training; the Faculty is to set SMART objectives for itself. Progress to be reported.

**Progress reported by Dean M&SS**

38. Course outlines in line with the heuristic method have been developed and are in practice.

**Recommendation**

39. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2432: MS Supply Chain Management - Launch Proposal**

Responsibility: DKC

**Decision of the 25<sup>th</sup> ACM**

40. BUKC to launch the same programme wef the Fall 2016 semester, subject to HEC's approval. Progress to be reported.

**Progress reported by DKC**

41. Proposal submitted to the HEC through Registrar's office. Approval awaited.

**Recommendation**

42. The point may remain on the agenda and progress reported.

**Discussion & Decision**



**Item 2435: PhD in Geo-Physics – Launch Proposal**

**Item 2437: MS in Geology – Launch Proposal**

Responsibility: DKC

**Decision of the 25<sup>th</sup> ACM**

43. Progress be reported.

**Progress reported by DKC**

44. HEC has approved to start PhD in Geophysics at BUKC. However, MS in Geology case is with HEC and pending approval.

**Recommendation**

45. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2440: BS Bioinformatics at the BUIC – Launch Proposal**

Responsibility: DIC

**Decision of the 25<sup>th</sup> ACM**

46. Progress be reported.

**Progress reported by DIC**

47. Detailed requirements/class rooms and laboratory requirements have been forwarded to Director P&D. Only upon availability of space this program can be started.

**Recommendation**

48. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2449: FCPS & MCPS Programmes in Clinical Dental Sciences at BUMDC – Launch Proposal**

Responsibility: Principal Dental Section BUMDC

**Decision of the 25<sup>th</sup> ACM**

49. Progress be reported.

**Progress reported by Principal Dental Section BUMDC**

50. CPSP will carry out Accreditation Inspection of the following disciplines on 31<sup>st</sup> Mar:
- a. Prosthodontics.
  - b. Orthodontics
  - c. Oral & Maxillofacial Surgery
  - d. Operative Dentistry

**Recommendation**

51. The point may remain on the agenda and progress reported. Report on the Accreditation Inspection may be sought.

**Discussion & Decision**

**Item 2452: Revamping Media Studies at the BUIC and BUKC**

Responsibility: Committee Head

**Decision of the 25<sup>th</sup> ACM**

52. Following Committee formed to study holistically the Media Studies programme being run at the BUIC and BUKC, and present its findings and recommendations at an inter-campus VLC by end-Nov:

- |                                  |   |                |
|----------------------------------|---|----------------|
| a. Dr Zubair Ghouri, HSS DeptIC  | - | Committee Head |
| b. Mr Adam Saud, HOD(HSS)IC      | - | Member         |
| c. Mr Munawwar Mirza, MS(Dept)KC | - | Member         |

**Progress reported by HOD(HSS)IC**

53. Dr. Zubair Ghouri was asked to give a presentation on the proposal to the Rector on December 11, 2015. The Rector approved the establishment of separate Media Studies departments at BUIC and BUKC. The case has been approved by 10th FBOS held on 15th January 2016 and would be taken to the next ACM for approval.

**Recommendation**

54. The Council may consider and decide on the recommendations of the Committee.

**Discussion & Decision**

**Item 2457: Modifications to Examination Rules, Proposals on**

Responsibility: DIC, DKC, DLC, DIPP, DGNCMPR

**Decision of the 25<sup>th</sup> ACM**

55. Progress be reported at the next ACM.

**Progress reported by CUs**

56. New examination rules have been promulgated and are being implemented.

**Recommendation**

57. The point may be dropped as sufficiently promulgated and actioned.

**Discussion & Decision**

**Item 2509: PhD Management Sciences – Addition of 23 Electives**

Responsibility: Dean(M&SS), Dean (ES)

**Decision of the 25<sup>th</sup> ACM**

58. The 23 electives listed at para 257, with details at Appendage 2509, approved for the PhD programme in Management Sciences, wef the Spring 2016 semester. Dean(M&SS) and the Dean(ES) are to study the electives lists of PhD programmes of their faculties and shortlist the electives which are no more relevant or in demand. Proposed deletion lists are to be tabled at the next ACM.

**Progress reported by Dean M&SS**

59. Committee has finalized the work. Report shall be submitted in the forthcoming ACM.

**Progress reported by Dean Engg**

60. The following list is tabled for next ACM for deletion:

S. No.	Course Code	Course Title	Credit Hours
1	EEN-803	Low Power System Design	3
2	EEN-816	Rural Electrification and Distributed Generation	3
3	EEN-818	Power System Deregulation	3
4	EEN-807	Power awareness in distributed systems	3
5	EEN-813	Power System Stability and Dynamics	3

**Recommendation**

61. The Council may consider and decide on the Dean M&SS's recommendations, and approve deletion of the Electives proposed by the Dean Engg.

**Discussion & Decision**

<b>Item 2510: PhD(CS) &amp; MS Engg Programmes - Changing the Nomenclature of the Research Methodology Course</b>
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Responsibility: Dean Engg
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**Decision of the 25<sup>th</sup> ACM**

62. Dean Engg to present the case on Research Methodology courses in the roadmaps of the MS and PhD programmes of the Engineering faculty, by the 1st week of Nov 2015.

**Progress reported by Dean Engg**

63. The meeting couldn't be scheduled before the start of Spring'2016. Once the semester started, the change (if any) would not have affected road map during the semester. Therefore the case would be presented in the 26<sup>th</sup> ACM.

**Recommendation**

64. Decision on the case may be taken in the light of the presentation to be made by the Dean Engg.

**Discussion & Decision**

**Item 2511: MPhil Programmes - Change of MPhil Nomenclature to MS**

Responsibility: Dean(M&SS)

**Decision of the 25<sup>th</sup> ACM**

65. MS programme in Management Sciences approved for the BUIC and the BUKC, wef the Spring 2015 semester, subject to HEC's approval. There shall be no more inductions into MPhil programmes. MPhil programmes currently in progress shall continue. Progress to be reported.

**Progress reported by Dean M&SS**

66. Case for MS (Management Sciences) programme has already been submitted to the Registrar's Office for onward submission to the HEC for approval.

67. A comprehensive proposal consisting case for all campuses has been submitted to the Registrar's Office for onward submission to the HEC.

**Recommendation**

68. The point may remain on the agenda and progress reported.

**Discussion & Decision**



**Item 2513: BS Psychology at BUIC – Launch Proposal**

Responsibility: DIC

**Decision of the 25<sup>th</sup> ACM**

69. BS Psychology approved in principle for launch at the BUIC wef the Fall 2016 semester, subject to availability of space. Progress to be reported.

**Progress reported by DIC**

70. The space for room has been earmarked in building No 3, new intakes, while lab will be accommodated before the beginning of the new semester. (BUIC)

**Recommendation**

71. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2516: MBA Programmes at BUIC & BUKC – Addition of Islamic Finance as Major**

Responsibility: Dean(M&SS)

**Decision of the 25<sup>th</sup> ACM**

72. MBA major in Islamic Finance approved for BUIC and BUKC wef the Spring 2016 semester. The major shall comprise the 5 specialisation courses, as listed at para 288, out of which a student shall be required to take four. Progress be reported.

**Progress reported by Dean (M&SS)**

73. MBA major in Islamic Finance has been advertised for Spring 2016 admissions at both BUIC and BUKC. Progress will be reported at the end of ongoing semester.

**Recommendation**

74. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2517: LLM at BUIC – Launch Proposal**

Responsibility: DIC

**Decision of the 25<sup>th</sup> ACM**

75. LLM programme approved for BUIC w.e.f. the Fall 2016 semester, subject to HEC's approval. Progress be reported.

**Progress reported by DIC**

76. The Higher Education Commission, Islamabad has been requested to issue NOC to the Bahria University for starting the LLM program w.e.f. Fall-2016 semester. The requisite documents have already been furnished to the HEC.

77. HOD-Law had two meetings with QAD of HEC. In the last meeting held on 08 December, 2015, The Consultant to QAD of HEC and the DG QA of HEC promised to place the item before the Quality Assurance Committee of HEC.

78. Accordingly, QA meeting was held at HEC and issuance of NOC to the Bahria University, Islamabad was also discussed therein. However, the minutes of the meeting have not yet been finalized at HEC level and the department is still waiting for the outcome of the meeting i.e., the decision regarding issuance of NOC to BUIC for LLM Program.

79. In addition, Pakistan Bar Council has revised their rules for imparting legal education in Pakistan, and as per their requirements, the department has also applied to PBC, and once NOC is issued by HEC, the case will be pursued with the PBC.

**Recommendation**

80. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2518: PhD(Geology) at BUIC – Launch Proposal**

Responsibility: DIC

**Decision of the 25<sup>th</sup> ACM**

81. PhD programme in Geology approved for BUIC wef the Spring 2016 semester, subject to HEC's approval. Progress be reported.

**Progress reported by DIC**

82. The PhD program has been approved by HEC. The road map and course outlines are being submitted for inclusion in the prospectus and the program is scheduled to start from Fall 2016.

**Recommendation**

83. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2519: PhD in Management Sciences at BULC - Launch Proposal**

Responsibility: DLC

**Decision of the 25<sup>th</sup> ACM**

84. PhD in Management Sciences at the BULC approved in principle, wef the Fall 2016 semester, subject to HEC's approval. Progress be reported.

**Progress reported by DLC**

85. Case with HEC; approval awaited.

**Recommendation**

86. The point may remain on the agenda and progress reported.

**Discussion & Decision**

**Item 2521: FYP Grades - Inclusion in the CGPA Calculation of the Final Semester**

Responsibility: DIC, DKC, DLC

**Decision of the 25<sup>th</sup> ACM**

87. With effect from the Fall 2015 semester, the result of the FYP, of the Engineering Departments, shall be submitted within two weeks of the semester end (last day of classes). It shall be ensured that a student's FYP result is included in the final semester GPA and the programme CGPA before deciding on any academic warning (Probation or Chance) or penalty (Drop). Progress is to be reported.

**Progress reported by DIC, DKC & DLC**

88. Point noted and promulgated for compliance.

**Recommendation**

89. The point may be dropped as sufficiently promulgated.

**Discussion & Decision**

<b>Item 2524: Honoraria Rates for Thesis/ Project Supervisors and Examiners at the UG and PG Levels</b>
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Responsibility: Dean Engg

**Decision of the 25<sup>th</sup> ACM**

90. Dean(M&SS) and Dean(ES) to study the rates of honorarium for thesis/project supervisors and examiners at the BS/BBA, MBA, MS/MPhil and PhD levels, and put up recommendations on file. Progress to be reported.

**Progress reported by Dean M&SS**

91. Honoraria Rates for Thesis/ Project Supervisors and Examiners at the UG and PG Levels have been finalized in agreement with the Dean Engg. Case is being submitted to the competent authority for approval.

**Progress reported by Dean Engg**

92. The recommendations from Faculty of Management Sciences have been received in March 2016, and the case would be moved on file during the next week for the approval of competent authority.

**Recommendation**

93. The Council may seek status of the case and decide accordingly.

**Discussion & Decision**

**Item 2530: Posthumous Award of Degree, Introduction of**

Responsibility: DAA

**Decision of the 25<sup>th</sup> ACM**

94. Posthumous award of honorary degree, to honour good students of the University who pass away at the verge of completing the academic programme, approved, subject to the following conditions:

- a. Maximum programme shortfall: 25% Credit Hours or one semester (whichever is more beneficial for the deceased).
- b. Not a Time Bar case.
- c. No ethical or disciplinary issues.
- d. Clean academic record viz plagiarism and unfair means in examinations.

95. Amendment to insert new clause in the BU Statutes "Posthumous Award of Honorary Degree" be processed. Progress to be reported.

**Progress reported by Director Academics**

96. The case was recommended by the Executive Committee and referred to the BOG; the BOG have referred it to the HEC.

**Recommendation**

97. The point may remain on the agenda and progress reported.

**Discussion & Decision**



**Item 2531: Posthumous Award of MSPM Degree to Late Air Cdre Altaf Hussain**

Responsibility: DAA

**Decision of the 25<sup>th</sup> ACM**

98. Case pended until amendment to BU Statutes (new BU Academic Regulations) vide Decision 2530.

**Progress reported by Director Academics**

99. Case linked to the outcome of the previous point.

**Recommendation**

100. The point may remain on the agenda and progress reported.

**Discussion & Decision**

## New Items

### Item 2601: BS (CS) - Curriculum Revision

Sponsor: HoD(CS)IC

Referral Authority: FBOS Engg

#### Summary of the Case

101. The case seeks approval to following changes in the curriculum for BS(CS) with the objective of bringing improvement in the programme, making strong alignment of the Road-Map and Curriculum with the HEC guidelines promulgated from time to time and help get the highest category of accreditation:

a. **Deletion of Courses**

GSC-105 Mathematics  
CSC-110 Computing Fundamentals  
CSL-110 Computing Fundamentals Lab  
GSC-113 Applied Physics  
GSL-113 Applied Physics Lab  
SEN-213 System Analysis and Design

b. **Adding of Core Courses**

CSC-111 Introduction to Information & Communication Technology (2 Cr Hr)  
CSL-111 Introduction to Information & Communication Technology Lab (1 Cr Hr)  
CSC-307 Professional Practices (2 Cr Hr)  
CEN-321 Microprocessors and Interfacing (2 Cr Hr)  
CEL-321 Microprocessors and Interfacing Lab (1 Cr Hr)

c. **Addition of New Course to the Electives List**

CSC-341 Introduction to Cloud Computing (3 Cr Hr)

d. **Moving Course from Core to Electives List**

CSC-444 Computer Graphics (2 Cr Hr)  
CSL-444 Computer Graphics Lab (1 Cr Hr)

102. Revised curriculum of BS(CS), along with course details of added courses, is placed at Appendage 2601 (page 78).

#### Discussion & Decision

**Item 2602: MS(CS) Programme - Curriculum Revision**

Sponsor: HoD(CS)IC

Referral Authority: FBOS Engg

**Summary of the Case**

103. MS(CS) program was launched in Fall 2013 and the first batch is at the graduation stage now. Curriculum of the programme has been revised to bring improvement and to make strong alignment of the Road-Map and the Curriculum with the HEC guidelines promulgated from time to time. The revision involves:

a. Revision in Core Courses. Only two courses are recommended as core courses along with one University Requirements course Research Methodology.

b. Addition of Elective. Course “Cloud Computing” (CSC-718)

104. The revision, placed at Appendage 2602 (page 84), is tabled for approval.

**Discussion & Decision**

**Item 2603: MS(SE) Programme – Adoption of HEC Roadmap 2013**

Sponsor: HoD(SE)IC

Referral Authority: FBOS Engg

**Summary of the Case**

105. HEC has revised roadmap for MS Software Engineering programme. The roadmap has been reviewed and further revised by the SE Dept BUIC. The revised roadmap has been approved by the FBOS Engg and is tabled for consideration and approval of the Academic Council. If approved by the Council, the roadmap shall be effective from the Fall 2016 intakes. Working paper and the revised roadmap are placed at Appendage 2603 (page 86).

**Discussion & Decision**

**Item 2604: MS(EM) Programme - Proposal for Revision and Realignment of Roadmap**

Sponsor: HoD(SE)IC

Referral Authority: FBOS Engg

**Summary of the Case**

106. While approving the MS(EM) programme for the BUIC, the HEC asked for some changes to be made to the roadmap. Consequently, the Dept revised the roadmap which is now placed at Appendage 2604 (page 103) for consideration and approval by the Council.

**Discussion & Decision**

**Item 2605: Pakistan studies & Islamic Studies, Revised Curriculum of**

Sponsor: HOD(H&amp;SS)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

107. HEC, upon directions from the Govt of Pakistan, has directed the HEIs to incorporate necessary amendments in the curriculum of Pakistan Studies and Islamic Studies with a view to creating an atmosphere of religious tolerance. To that end, amendments proposed in-house at the BU are placed at Appendage 2605 (page 123). The amendments focus on inculcating patriotism, religious tolerance, humanity, brotherhood and the human rights as ordained by Islam, among the students.

**Discussion & Decision**

**Item 2606: BCE Programme - Approval of Curriculum**

Sponsor: HoD(C&amp;SC)KC

Referral Authority: FBOS Engg

**Summary of the Case**

108. BCE programme at the BUKC is under accreditation visit by the PEC. When the programme was re-started in Fall 2013, the roadmap which the BUIC had been following was adopted for the BUKC. During their interim visit, the PEC team were shown ACM minutes highlighting approval of the BCE curriculum and the changes thereto from time to time, and were reported that ACM approvals are university-wide, applying uniformly to the campuses where the same programme is run. The team was also informed that that the same curriculum also makes part of the programme prospectus. However, the team insisted on seeing “approval of the BCE curriculum at the BUKC from the statutory body of the university”. To meet the PEC team’s demand, formal approval to the BCE’s existing roadmap placed at Appendage 2606 (page 127) and also stipulated in the programme prospectus, is requested for the BUKC specifically.

**Discussion & Decision**

**Item 2607: MSEE Programme - Revised Roadmap and Curriculum**

Sponsor: HoD(EE)KC

Referral Authority: FBOS Engg

**Summary of the Case**

109. Bahria University has been offering MSEE program in four different specialisations, since Fall 2012. The HODs EE of the BUIC and BUKC have revised and updated the MSEE roadmap and curriculum in order in synchronization with the with the present demands and the future trends. The revised curriculum and roadmap are placed at Appendage 2607 (page 130), and are tabled for approval.

**Discussion & Decision**



**Item 2608: PhD EE in Control Systems - Addition of Elective**

Sponsor: HoD(EE)IC

Referral Authority: FBOS Engg

**Summary of the Case**

110. PhD EE scholars pursuing research in Control Systems have few courses available in the Electives List. HEC has also desired to update and increase the elective courses for the PhD programme. To that end, the course 'Advanced Nonlinear Control Systems (EEN-828)' is proposed to be added to the Electives List. The course outline is part of the working paper attached at Appendage 2608 (page 137).

**Discussion & Decision**

**Item 2609: MS SE and PhD SE Common Courses**

Sponsor: HOD(SE)IC

Referral Authority: FBOS Engg

**Summary of the Case**

111. Following courses of the MS SE roadmap have been revised and are considered suitable for teaching at the PhD level.

1	SEN-758	Component-based Software Engineering	3
2	SEN-760	Complex Adaptive Systems	3
3	SEN-761	Semantic Web	3
4	SEN-762	Advanced Data Analytics and Business Intelligence	3
5	SEN-759	Software Re-Engineering	3

112. Details of these courses may be found at Appendage 2609 (page 139). Approval may accorded to include these courses in the PhD roadmap as well.

**Discussion & Decision**

**Item 2610: LLB Programme – Adoption of the new HEC Curriculum-2015**

Sponsor: HOD(Law)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

113. The HEC's National Curriculum Review Committee has revised the LLB 5-year curriculum. The HEC has asked for adoption of these changes by the Academic Council of the HEIs. The changes and the revised curriculum are attached as Appendage 2610 (page 140). The FBOS had agreed to the revised curriculum but had decided to wait for official notification of the revised curriculum by the HEC, which has since been received and made part of the appendage.

114. The Law Dept BUIC has also sought approval to implement the new curriculum w.e.f. the Fall-2016 intake.

**Discussion & Decision**

**Item 2611: MS Finance – Introduction of Islamic Banking and Finance as a Specialisation**

Sponsor: HOD(MS)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

115. The potential of Islamic Finance industry is growing. It would be prudent to add a specialisation in Islamic Finance in all the Masters programmes which the BU is running, that is, MBA and MS, in addition to existing specialisations of Finance, Marketing, Human Resources etc. There is a good number of institutions globally as well as in local market offering Islamic Finance qualification.

116. BUIC wishes to introduce the specialisation of Islamic Banking and Finance in the existing MS-Finance programme towards which the admission response has been very encouraging, as the first step. The specialisation would cover the following subjects:

- a. Islamic Commercial Laws
- b. Islamic Insurance
- c. Islamic Banking
- d. Islamic Capital Market
- e. Islamic Accounting
- f. Regulation & Governance of Islamic Financial Institutions
- g. Seminars in Islamic Finance

117. In the next step, the Campus would launch a full-fledged MS programme in Islamic Banking and Finance depending on the market response.

118. The proposal is tabled for consideration. Working paper and the course contents are placed at Appendage 2611 (page 145).

**Discussion & Decision**

**Item 2612: MS(IR) – Launch Proposal**

Sponsor: HOD(H&amp;SS)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

119. After graduating with BSS(IR) degree from the BUIC, the students who wish to continue higher studies in IR seek admission in other HEIs. BU, therefore, loses a potential captive intake. With three PhDs in IR in the fold, the Department can conveniently run an MS programme. Such a programme will also add to the University's academic portfolio. Approval is, therefore, sought to run MS(IR) at the BUIC wef Fall 2016 subject to NOC from the HEC. Working paper, the programme content and the New Programme Proposal document are placed at Appendage 2612 (page 150).

**Discussion & Decision**

**Item 2613: MS (Information Security) – Launch Proposal**

Sponsor: HoD(CS)IC

Referral Authority: FBOS Engg

**Summary of the Case**

120. Threat to IT has increased commensurate with its advancements. Hacking, cyber-attacks, phishing, malware and other threats to cyber based information means that strategies have to be learnt and adopted to safeguard info through prevention and countermeasures. BS(IT) and BCS students will greatly benefit from an MS programme in Information Security. They can also venture into collaborative/joint research with the Yasar University which too runs this programme and with which the BU has an MOU which *inter alia* covers joint/collaborative research.

121. The proposal is placed before the Council. Working paper, Programme Outline and the New Programme Proposal document are placed at Appendage 2613 (page 155). The case seeks approvals for the following actions:

- a. Finalisation of the MS(IS) roadmap in consultation with Yasar University.
- b. Establishing a lab for the programme.
- c. Application to the HEC for NOC.

**Discussion & Decision**

**Item 2614: Master of Computer Science (MCS) at BUIC – Launch Proposal**

Sponsor: HoD(CS)IC

Referral Authority: FBOS Engg

**Summary of the Case**

122. MCS is a 2½ year programme designed for BSc graduates from the government colleges to learn computing knowledge and skills, to help them develop and design software products in the IT/software industry. It is envisaged that the programme will strengthen the University's MS(CS) and MS(T&N) programmes. Seven other HEIs are already running the programme in the Peshawar-Islamabad/ Rawalpindi-Lahore region.

123. The case was contested in the FBOS on the following grounds:

- a. The programme does not match with the long term vision and plan of the University, and faculty of Engineering Sciences
- b. The universities are moving to the 4-year BS and 2-year MS programmes and none of the reputed universities has launched the said programme during the last 10 years.
- c. The agenda has twice been declined at FBOS and ACM in the last couple of years and nothing has changed since then to support the programme.

124. The matter is table before the Council. Working paper, programme roadmap and the New Programme Proposal document are attached as Appendage 2614 (page 159).

**Discussion & Decision**

**Item 2615: MS Mathematics at BUIC – Launch Proposal**

Sponsor: HoD(EE)IC

Referral Authority: FBOS Engg

**The Case**

125. As the technology becomes more complex and diversified, the demand for mathematicians is on the rise, both in the industry and the academia. There is also a need to integrate academia from the Engineering and Management Sciences programmes into a Mathematics programme. These objectives in view, MS Mathematics is proposed as an evening programme at the BUIC. It is envisaged that the programme will increase enrolments and contribute to the BU's programmes portfolio. The Dept will need two PhDs to run the programme. Working Paper, Programme Roadmap and Course Outline are attached as Appendage 2615 (page 166).

**Discussion & Decision**



**Item 2616: MS Applied Mathematics - Launch Proposal**

Sponsor: HOD(H&amp;NS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

126. There is a need to prepare graduates for a successful career in the industrial, business and educational worlds. To that end, it is considered essential that the analytical and problem solving skills of the students be improved. An MS programme in Applied Mathematics can address such a requirement which the case purports to launch. The programme will require one PhD and one MS/PhD. Working paper and the New Programme Proposal document are attached at Appendage 2616 (page 186).

**Discussion & Decision**

**Item 2617: BSS (International Relations, Media Studies, Development Studies) –  
Changing BSS nomenclature to BS**

Sponsor: HOD(H&SS)IC

Referral Authority: FBOS M&SS

**Summary of the Case**

127. The Department of H&SS BUIC offers BSS degree in three streams – International Relations, Media Studies and Development Studies. The degrees are transcribed as BSS(International Relations) and so forth. Students of BSS study the first three semesters of common courses together, at the end of which they make their choice for the particular stream.

128. The case seeks two changes:

- a. Change the BSS nomenclature to BS as the former is perceived to cause confusion. So the degrees would now be transcribed as BS(International Relations) and so forth.
- b. Students chose, and join their chosen stream, *ab initio* with the provision of changing the stream within the first two weeks of the 1<sup>st</sup> semester. However, the students would still study the first three semesters of common courses together. It is perceived that this measure would help the students focus better on their chosen stream.

129. Working paper on the subject is placed at Appendage 2617 (page 189).

**Discussion & Decision**

**Item 2618: BS(Anthropology) –Proposal for start of Stream in H&SS Dept: BUIC**

Sponsor: HOD(H&amp;SS)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

130. H&SS Dept BUIC wishes to launch BS (Anthropology) from Fall 2016 with the following rationale:

- a. It will be a suitable replacement for the BS(Media Studies) programme which the Dept is losing to a separate Dept.
- b. Students demand it.

131. Working paper is placed at Appendage 2618 (page 194).

132. BS and MPhil(Anthropology) had been regular programmes at the BUIC until 2013 when an academic audit of the H&SS Dept, in May 2013, found them to be failing. Taking due cognizance of the audit report, the 21<sup>st</sup> ACM (Oct 2013) decided to discontinue them on the following grounds:

- a. BS(Anthropology) had not attracted even a single student in the last six semesters.
- b. MPhil(Anthropology) had lost student interest and was, therefore, a fit case for closure.

133. The proposal is tabled for consideration.

**Discussion & Decision**

**Item 2619: MS in HRM & Organizational Psychology – Launch Proposal**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

134. MS in HRM & Organizational Psychology is a hybrid programme which combines Human Resource Management with its Psychological dimensions. The programme is designed for graduates and professionals with strong desire for attaining comprehensive understanding of organisational functioning in the highly competitive contemporary environment. The programme draws on the strengths of the University's Management Sciences and the Psychology programmes, and aims at serving both the society and the industry. The programme will also contribute to the University's growth.

135. Working paper and the New Programme Proposal document are attached as Appendage 2619 (page 197). The programme envisages induction of 15-20 students with a net earning of Rs 0.1 million in the first year. Approval is requested to start the programme in the evening/weekend format.

**Discussion & Decision**

**Item 2620: MS in Insurance and Risk Management at all Campuses - Launch Proposal**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

136. MS in Insurance and Risk Management is a futuristic programme which will provide a new stream of research and value addition to the existing portfolio of BU's degree programmes. The programme is being offered in some of the world renowned universities and few public universities in Pakistan. With the declining interest of students in MS (Finance), this program would provide an attractive alternative.

137. Working paper and the New Programme Proposal document are attached as Appendage 2620 (page 221). The working paper talks of conducting a market survey before presenting the matter before the ACM. The sponsor may like to present the details/results of the survey conducted.

**Discussion & Decision**

**Item 2621: MS EE at BUKC in the Evening/Weekend Format – Launch Proposal**

Sponsor: HoD(EE)KC

Referral Authority: FBOS Engg

**Summary of the Case**

138. BUKC has been running MS EE since 2011 as a regular programme (on week days in the working hours). Resultantly, it cannot be availed by the working students. Permission is sought to launch its weekend/evening versions. The case does not carry a feasibility study or the New Programme Proposal document. Working paper is attached as Appendage 2621 (page 237).

**Discussion & Decision**

**Item 2622: MS Engg Management at BUKC – Launch Proposal**

Sponsor: HoD(EE)KC

Referral Authority: FBOS Engg

**Summary of the Case**

139. MS Engineering Management is a recently launched programme at the BUIC. BUKC is keenly interested in launching the same programme in the evening/weekend format. The case does not, however, carry the feasibility study or the University's New Programme Proposal document. The working paper is clubbed with that of the previous item at Appendage 2621 (page 237).

**Discussion & Decision**

**Item 2623: PhD Psychology-Launch Proposal**

Sponsor: HOD(PP)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

140. The Department of Professional Psychology at the BUIC is running MS degree programs in Clinical Psychology with two batches inducted and 57 students enrolled. The first batch will graduate this year. The programme is deemed to have consolidated and achieved the desired degree of success. Many of the graduates would be looking forward to PhD and it would be mutually beneficial if BU could provide them an opportunity to do their doctoral studies right here and benefit from other incentives the University offers to its own graduates. Also, a PhD degree with specialization in Clinical Psychology is not being offered in Islamabad and Rawalpindi.

141. The Dept wishes to launch PhD Psychology from this Fall semester along with BS Psychology which the last ACM had approved. Induction of 5 PhD scholars per semester is planned which is below the break-even figure of 9. Working paper and the New Programme Proposal document are placed at Appendage 2623 (page 238), which spell out the following requirements for PhD programme:

- a. Extended lab capable of conducting PhD level psychological tests.
- b. Permanent or convenient internship site to enable 500 hrs of internship to each student.
- c. Induction of at least one PhD.

142. The Case is tabled for consideration.

**Discussion & Decision**



**Item 2624: BS Psychology Program at Lahore Campus – Launch Proposal**

Sponsor: Dir. IPP Karachi

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

143. BULC had been asked by the BUHQ to carry out feasibility study for launching a BS programme in Psychology. BULC's feasibility study, placed at Appendage 2624 (page 241), finds the programme viable and feasible for launch at the BULC, with an anticipated induction of 20 students per semester, and subject to:

- a. construction of additional floor;
- b. establishment of lab; and
- c. induction of faculty.

144. The feasibility study needs to address the aspect of internship in the Psychology Dept of some local hospitals, which will require some sort of legal underpinning. The case is tabled for consideration.

**Discussion & Decision**

**Item 2625: MS Supply Chain Management at BULC – Launch Proposal**

Sponsor: HOD(MS)LC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

145. MS Supply Chain Management [MS(SCM)] has already started at the BUIC and is already approved for launch at the BUKC after its approval from the HEC. The same programme may be approved for the BULC on the grounds that Lahore is a lucrative captive market for SCM; four local universities are already running the programme. An anticipated induction of 10 students per intake with two intakes per year will yield a net profit of Rs 0.778 million per annum. Detailed working paper on the case and the New Programme Proposal document are placed at Appendage 2625 (page 256).

**Discussion & Decision**

**Item 2626: BEd (Hons) at College of Teacher Education – Launch Proposal**

Sponsor: DE

Referral Authority: Decision on DE File

**Summary of the Case**

146. College of Teacher Education (CTE) is an affiliated unit of the BU. The College has been running the one-year BEd programme for some time. In 2013, the HEC directed all concerned colleges to phase out the one-year BEd programme by 2016, and replace it with a 4-year BEd Hon programme (Elementary/Secondary), for candidates with 14 and 12 years education. The case will be presented to the Council by the CE of the Kashmir Education Foundation. Working paper is attached as Appendage 2626 (page 269).

**Discussion & Decision**

**Item 2627: Award of Medal to Mr Kaleem Sarwar, a BU Alumnus from the MBA Trimester Programme at the BUKC**

Sponsor: DE

Referral Authority: NHQ

**Summary of the Case**

147. BU's medal awards are open to students who, inter alia, take "full academic load" during the "regular semesters" (Fall and Spring). BUKC (only) runs some MBA programmes on the trimester format which does not constitute the "regular semesters", nor its semesters are in synch with the regular semesters, nor is its semester load of 12 credit hrs (in general) considered equivalent to the "full semester load". As such, BUKC's trimester students have never been considered eligible for award of medals.

148. Mr Kaleem Sarwar, a trimester graduate who stood first in the batch, with 3.75 CGPA, has challenged BU on his ineligibility and claimed gold medal. He has approached the Federal Ombudsman and the BU Pro-Chancellor for the award. NHQ has asked the University to place his case before the Academic Council. The sponsor's working paper is attached as Appendage 2627 (page 271).

149. While the BU's academic rules on the subject are clear, the Council may seize the opportunity to make any improvements in the rules to ward off a similar situation in the future. The Council may consider the following ineligibility clause which is already incorporated in the draft Academic Rules:

"has not taken a programme which does not follow the semester system, like the EMBA or the trimester-based MBA Weekend programmes."

150. The clause may be formally approved.

**Discussion & Decision**

**Item 2628: PhD Candidates, In-House Admission Test for**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

151. In the wake of the Lahore High Court decision on the HEC-vs-NTS case, the HEC had given the following options to the HEIs viz admission tests for the PG programmes:

- a. NTS GAT (General/Subject) as applicable
- b. Similar admission test by another testing service provider.
- c. University's own admission test.

152. For MS/MPhil, BU decided to take own admission tests but for admissions into PhD programmes it was decided to stick with the NTS GAT (Subject). Because of this latter condition, BU lost a number of good PhD candidates to other HEIs because they, the candidates, did not possess the NTS GAT (Subject) pass because their field of study did not figure in the NTS portfolio of tests. This case reviews the earlier decision in favour of own test as most other HEIs have done.

153. In the meantime, the HEC has reconciled with the HEI's lack of interest in the NTS GATs and given the HEIs following guidelines if they are to conduct own admission tests for the PG programmes (HEC letter No 1-3/AD-QA/HEC/NQAC(21)/2016/S-2 dated Mar 18, 2016 refers):

- a. Test be at par with GRE (General) or GRE (Subject) as applicable.
- b. An Admission Committee be constituted and notified.
- c. Admission Committee to include 2-3 PhDs in the relevant discipline, with one preferably from outside the HEI.
- d. Composition of the Admission Committee, and any changes thereto, be communicated to the QA Division of HEC.

154. It is proposed that the aforementioned guidelines from the HEC be adopted for admission to PG programmes at the BU. Sponsor's working paper on the subject is attached as Appendage 2628 (page 273).

**Discussion & Decision**

**Item 2629: Course 'Withdrawn' Cases – Eligibility for the Summer Session**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

155. A student who withdraws from a course within first seven weeks of the semester gets a 'W' grade. Such a student must do the course in the next regular semester; the student cannot avail the Summer Session which is reserved for failed cases (Grade 'F') or improvement cases (Grade 'C' or below). Before the rules were amended by the 21st ACM (Oct 2013), 'W' cases could also avail the Summer Session.

156. It is felt the denying the 'W' cases an opportunity to avail the 'W' course in Summer Session creates time-management difficulties for the student and the risk of nudging them into a time-bar situation. It is, therefore, proposed that 'W' cases be made eligible for the same course in the Summer Session. To prevent potential misuse of this concession by any student, the 'W' course in the Summer Session may only be allowed on the recommendation of the HOD. Working paper on the subject is attached at Appendage 2629 (page 274).

**Discussion & Decision**

**Item 2630: Common Courses - Revision of the Academic Council Decision on Pooling Up Faculty**

Sponsor: DIC

Referral Authority: Decision on BUIC File CS/2016

**Summary of the Case**

157. At the BUKC, the Dept of HNS, meets the requirement of all common courses for all the departments; this arrangement has been a success. The Academic Council, vide its Decision 2325 (Oct 2014), had asked BUIC to follow suit, in the following words:

“Improve the system in place for pooling up faculty for the common courses under the HSS Dept, through better management, communication and inter-departmental coordination. A committee headed by the DIC with the HODs as members to strategise improvements and put up report within 10 days.”

158. To the next ACM (May 2015), following progress report was made to the Council:

“The committee studied the core issue of common courses and suggested a way forward for future course of action. A report was prepared on the process and system of faculty working for common courses. It was submitted to the Registrar. The changes have been implemented and all the specialised FMs have been transferred to their parent department. The system is enforced w.e.f. Spring 2015 semester and is working smoothly.”

159. Upon query, the Council was informed that by “parent department” the Dept of HSS was meant where all faculty members teaching common courses were pooled up. The Council was satisfied with the progress reported and decided to drop the point concluding that the system of pooling of faculty for common courses was working fine.

160. In the Fall 2015 semester, just six months after reporting satisfaction to the Academic Council, the problem of common courses was raised by different departments in the HODs’ Coordination Meeting with the DIC. A committee comprising the HOD(CS), HOD(HSS) and HOD(MS) proposed reviewing the previous decision of Academic Council, with the following changes:

- a. Common courses i.e. English, Pakistan Studies, Islamic Studies, IR, Anthropology, Sociology and Media Studies be arranged and managed by the department offering these courses. Expertise of HSS department be used if deemed necessary.
- b. Superfluous Regular faculty members of the HSS department be transferred to other departments on the basis of their actual teaching load requirements.
- c. HOD concerned be responsible for the evaluation and appraisal of the visiting/regular faculty members teaching common courses.
- d. HOD (HSS) to provide support to other departments in selection of visiting faculty members as well as curriculum designing.

161. The case is tabled for consideration; working paper is attached at Appendage 2630 (page 275).

## Discussion & Decision



**Item 2631: MBA 1.5 – Extension of Eligibility to BBA Graduates from all HEIs**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

162. Presently, MBA 1.5 is offered to BBA Graduates of BU and of those HEIs comparable with or superior to BU, with a view to ensuring a quality intake. This rule made sense when the BU BBA graduates did not have to go through the admission test. Now, under the new HEC directive, which makes the admission test mandatory, there is no justification for this restriction. The aspect of quality ought to be taken care of by the admission test. It is, therefore, proposed that BU's MBA1.5 programme may be open to the BBA Graduates of any HEI. Working paper on the case is attached at Appendage 2631 (page 276).

**Discussion & Decision**

**Item 2632: MBA Thesis/Project Rules, Unification of**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

163. MBA Thesis/Project Rules were approved by the 23<sup>rd</sup> ACM (Oct 2014). During the progress review in the next ACM, some members objected to the use of the term 'Project' alongside 'Thesis', arguing that the dynamics of the two were different and their rules, therefore, could not be clubbed together. The Council upheld the objections and directed to remove all references to the term 'Project' from the rules.

164. The Faculty of Management Sciences have revisited the rules and found that majority of the Thesis Rules applied in equal measure to the 'Project' and, as such, there could be one document covering both the 'Thesis' and 'Project', highlighting the differences where applicable. The Faculty has accordingly re-clubbed the terms 'Thesis' and 'Project' in the rules on the said lines and elaborated the differences where they existed, particularly in the forms. The revised rules were processed on file and approved after favourable comments from the stakeholders. The rules, titled 'MBA Thesis/Project Rules', are presented to the Council for formal approval and adoption. Working paper and draft MBA Thesis/Project Rules are attached at Appendage 2632 (page 277).

**Discussion & Decision**

**Item 2633: MBA Programmes – Bringing TOC Eligibility at par with MS/MPhil**

Sponsor: DIC

Referral Authority: Decision on File BUIC/619/3/2016/133

**Summary of the Case**

165. As per existing rules, MBA students of other HEIs, upon migration to BU, are eligible to apply for TOC if their CGPA is at least 2.5/4.0 and the grade in the TOC subject is at least 'C+'. For MS/MPhil, these minima are 3.0 CGPA and 'B' grade. Since grading scheme (pass marks and min CGPA for degree award) and academic penalties for MBA are the same as for MS/MPhil, it is proposed that the TOC eligibility minimum for MBA be parred with MS/MPhil, that is, it be raised to 3.0 from the current 2.5, and the minimum grade for TOC subjects be raised to 'B' from the current 'C+'. Working paper is attached as Appendage 2633 (page 294).

**Discussion & Decision**

**Item 2634: LLB Programme - Revision of Eligibility Criteria**

Sponsor: HOD(Law)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

166. The LLB (5-Year) program was started at the BUIC in Fall-2010, after its approval from the 15<sup>th</sup> ACM, with the eligibility criterion set at 45% marks in the HSSC/Equivalent exam. Though considered a low criterion, it was essential at that stage to kick start the programme with sufficient number of students. The programme is now fully consolidated and has been attracting increasing number of applicants. Analysis indicate that most of the students admitted to the LLB program have more than 50% marks in the HSSC/Equivalent exams. It is considered, therefore, the right time to raise the eligibility criteria from current 45% marks to 50% marks in HSSC/Equivalent exam. The case is tabled for consideration. Working paper is attached at Appendage 2634 (page 295).

**Discussion & Decision**

**Item 2635: TOC Eligibility – Extension to 1.5 Year Programmes**

Sponsor: HOD(MS)IC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

167. BU Academic Rules permit TOC in programmes of 2.0 year and above duration. When this rule was enacted, the University was not running any programme of less than the said duration except for MBA 1.5. Since then, a number of 1.5 year programmes have been launched by BU and other HEIs. Many students of 1.5 year programmes from other HEIs wish to transfer to BU programmes but for the TOC ineligibility posed by the quoted rule. It would be in the interest of the BU to forego this rule. The working paper is attached as Appendage 2635 (page 296).

**Discussion & Decision**

**Item 2636: Examination Rules – Relaxation to Late Reporting Time**

Sponsor: HoD(CE)IC

Referral Authority: FBOS Engg

**Summary of the Case**

168. According to the current Examination Rules, a student is not permitted entry into the Examination Hall beyond 5 minutes of the official start time. Experience has it the late coming students suffer heavily in situations where the course in question is offered once a year and it is the final semester of the student, or the course is also a 'pre-requisite' to a course in the next semester. This rule may be relaxed to allow admissions into the examination hall within 15 minutes past the official start time. Working paper is attached at Appendage 2636 (page 297).

**Discussion & Decision**

**Item 2637: Reduction of Semester Teaching Weeks to 15 and Introduction of Students Week for Co-Curricular Activities**

Sponsor: DIC

Referral Authority: Decision on File BUIC/619/3/2016/133

**Summary of the Case**

169. A semester at BU is of 18 weeks, inclusive of 2 weeks reserved for the mid-term and final examinations. That leaves 16 weeks (48 contact hours per subject) for dedicated teaching. HEC draft rules permit a regular semester duration of 16-18 weeks with 2 weeks reserved for examinations. It is proposed that the number of teaching weeks be reduced to 15 (45 contact hrs per subject) and one week thus saved be designated as the 'Students Week', dedicated to students' co-curricular activities which can then be performed with concentration and without worrying for, or disturbing, the classes. Working paper is attached as Appendage 2637 (page 298).

**Discussion & Decision**

**Item 2638: Media Studies Departments at BUIC & BUKC, Formation of**

Sponsor: HOD(H&amp;SS)IC

Referral Authority: FBOS M&amp;SS &amp; Decision on BUKC File

**Summary of the Case**

170. At the BU, the Media Studies programmes have been taught under the ambit of the Humanities and Social Sciences Department at the BUIC and Management Sciences at the BUKC. Creation of a separate Department of Management Sciences would help revamp the Media Studies programmes and contribute to their and the University's growth. The case seeks approval to create Departments of Management Sciences at the BUIC and the BUKC, to manage and teach all media studies programmes, at the UG and PG levels. Working paper is placed at Appendage 2638 (page 299).

**Discussion & Decision**



**Item 2639: Community Service - Integrating into Curriculum**

Sponsor: HoD(CS)IC

Referral Authority: FBOS Engg

**Summary of the Case**

171. At the BU, the Community Support Programme (CSP) is mandatory for all the undergraduate students. The students have to complete 40 hours of community work during their 4-year undergraduate studies.

172. Currently, CSP is managed by the Student Resource Centre (SRC) which finds it difficult to manage due to the sheer numbers. Vide the working paper placed at Appendage 2639 (page 300), it has been proposed that CSP be made a part of the curriculum; the same practice is being followed at the NUST and FJWU. To that end, the case makes the following recommendations:

- a. CSP may be integrated into the curricula of all the undergraduate programmes, as a non-credit course, preferably in the 3<sup>rd</sup> or 4<sup>th</sup> Semester.
- b. SRC may be strengthened to run CSP effectively and efficiently.
- c. CSP may be integrated into the schedule of SRC activities in every semester and be available to departments before the start of semester to be integrated in the time table.
- d. CSP may be registered by the students in Campus Management System as non-credit hours course
- e. CSP may be reflected on transcript, similar to Internship.

173. The case is tabled for consideration.

**Discussion & Decision**

**Item 2640: BBA Programme - Activity Based Assessment of the 'Oral Communication' Course**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

174. 'Oral Communication' course forms part of the BBA curriculum. True to its name, any written assessment tool for this course would be unsuitable. The course assessment needs to be assessed on the student's demonstrated ability to perform different tasks. To that end, an assessment format has been proposed at Appendage 2640 (page 301) as part of the case working paper, for approval.

**Discussion & Decision**

**Item 2641: Vision, Mission & Objectives of the IPP and its Programmes**

Sponsor: Dir. IPP Karachi

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

175. Vision and Mission statements is critical to a company's organizational strategy. Most established companies, or organisational entities develop uniform Vision and Mission. At an HEI, these travel down to the level of faculties and departments. To that end, the Institute of Professional Psychology has drafted Vision and Mission statements, along with the Mission, learning Objectives and Outcomes of each of its Programmes; these are attached as Appendage 2641 (page 302).

176. The case seeks approval of Vision, Mission, Objectives and Outcomes for the Institute of Professional Psychology and its Programmes, as enunciated at the appendage.

**Discussion & Decision**

**Item 2642: Vision, Mission, Objectives & Outcomes of MS Department & Programmes – Uniformity of**

Sponsor: HOD(MS)KC

Referral Authority: FBOS M&amp;SS

**Summary of the Case**

177. Uniformity of Vision and Mission statements is critical to a company's organizational strategy. Most established companies, or organisational entities develop uniform Vision and Mission. At an HEI, these travel down to the level of faculties and departments. To that end, the Faculty of Management Sciences has drafted Vision and Mission statements for its Departments, along with the Mission, learning Objectives and Outcomes of each of its Programmes, as produced at Appendage 2642 (page 304). These statements will also meet the requirements of the NBEAC, the accreditation body of business education.

178. The case seeks approval of Vision, Mission, Objectives and Outcomes for the Departments and Programmes under the Faculty of Management Sciences.

**Discussion & Decision**

**Item 2643: Grooming Students, Framework for**

Sponsor: Dean M&amp;SS

Referral Authority: Registrar Notification FCP/378/565 dt 23<sup>rd</sup> Dec 2015**Summary of the Case**

179. A BU graduate, like any other university graduate, ought to demonstrate professionalism in communication, presentation skills, resume & CV building, interviewing techniques, self-management etc. A framework encompassing measures to groom students in the said areas shall be presented to the Council.

**Discussion & Decision**

### Changes to BS (Computer Science) Curriculum

The case was presented by HOD (CS), Islamabad Campus in the FBOS meeting held on 10th March, 2016 and the following revisions are recommended for approval.

a. **Courses Deleted:**

The following courses are recommended to be removed as per HEC guidelines from the BS (CS) road-map:

- GSC-105 Mathematics
- CSC-110 Computing Fundamentals
- CSL-110 Computing Fundamentals Lab
- GSC-113 Applied Physics
- GSL-113 Applied Physics Lab
- SEN-213 System Analysis and Design

b. **Adding New Core Courses**

- CSC-111 Introduction to Information & Communication Technology (2 cr. Hrs)
- CSL-111 Introduction to Information & Communication Technology Lab (1 cr. Hrs)
- CSC -307 Professional Practices (2 credit hours)
- CEN-321 Microprocessors and Interfacing (2 credit hours)
- CEL-321 Microprocessors and Interfacing Lab ( 1 credit hour)

c. **Adding New Course to Electives List**

- CSC-341 Introduction to Cloud Computing (3 credit hours).

d. **Moving Course from Core to Electives List**

- CSC-444 Computer Graphics (2 credit hours)
- CSL-444 Computer Graphics Lab (1 credit hours)

### Annexure

### Proposed New Road Map BS (Computer Science)

#### **Road Map Fall 2016**

##### **Semester 1:**

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/ Sem
None	GSC-110	Applied Calculus & Analytical Geometry	3	0	3	18
None	CSC-110	Introduction to IT & CT	2	0	2	
None	CSL-110	Introduction to IT & CT Lab	0	1	1	
None	ENG-103	English-I	2	0	2	
None	ISL-101	Islamic Studies	2	0	2	
None	CSC-113	Computer Programming	3	0	3	
None	CSL-113	Computer Programming Lab	0	1	1	
None	EEN-210	Basic Electronics	3	0	3	
None	EEL-210	Basic Electronics Lab	0	1	1	

##### **Semester 2:**

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/ Sem
GSC-110	GSC-211	Multivariable Calculus	3	0	3	
None	PAK-101	Pakistan Studies	2	0	2	

CSC-113	CSC-210	Object Oriented Programming	3	0	3	16
CSC-113	CSL-210	Object Oriented Programming Lab	0	1	1	
EEN-210	CEN-120	Digital Logic Design	3	0	3	
EEN-210	CEL-120	Digital Logic Design Lab	0	1	1	
None	GSC-221	Discrete Mathematics	3	0	3	

### Semester 3:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
None	SEN-220	Software Engineering	3	0	3	17
CEN-120	CEN-221	Computer Architecture & Organization	3	0	3	
CEN-120	CEL-221	Computer Architecture & Organization Lab	0	1	1	
CSC-113	CSC-221	Data Structure and Algorithm	3	0	3	
CSC-113	CSL-221	Data Structures and Algorithm Lab	0	1	1	
None	GSC-122	Probability and Statistics	3	0	3	
ENG-103	HSS-120	Communication Skills	3	0	3	

### Semester 4:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
CSC-210	CSC-313	Visual Programming	2	0	2	19
CSC-210	CSL-313	Visual Programming Lab	0	1	1	
CEN-120	CEN-321	Microprocessor & Interfacing	2	0	2	
CEN-120	CEL-321	Microprocessor & Interfacing Lab	0	1	1	
SEN-213	CSC-220	Database Management System	3	0	3	
SEN-213	CSL-220	Database Management System Lab	0	1	1	
GSC-110	GSC-210	Differential Equations	3	0	3	
NONE	CSC-315	Theory of Automata	3	0	3	
SEN-220	SEN-320	Human Computer Interaction	3	0	3	

### Semester 5:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
GSC-210	GSC-121	Linear Algebra	3	0	3	19
NONE	CEN-222	Data Communication and Networking	3	0	3	
NONE	CEL-222	Data Communication and Networking Lab	0	1	1	
CSC-113	SEN-310	Web Engineering	2	0	2	
CSC-113	SEL-310	Web Engineering Lab	0	1	1	
CSC-221	CSC-321	Design and Analysis of Algorithms	3	0	3	
CSC-315	CSC-323	Compiler Construction	2	0	2	
CSC-315	CSL-323	Compiler Construction Lab	0	1	1	
HSS-120	HSS-320	Technical Writing & Presentation Skills	3	0	3	

### Semester 6:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
CSC-210	CSC-411	Artificial Intelligence	2	0	2	
CSC-210	CSL-411	Artificial Intelligence Lab	0	1	1	

CEN-221	CSC-320	Operating System	3	0	3	16
CEN-221	CSL-320	Operating System Lab	0	1	1	
GSC-210	GSC-320	Numerical Analysis	3	0	3	
		Elective-1 (3+0 or 2+1)	3	0	3	
		Elective-2 (3+0 or 2+1)	3	0	3	

#### Summer:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
		Internship	0	0	0	0

#### Semester 7:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
NONE	ESC-498	Project-I	0	3	3	17
NONE	HSS-421	Entrepreneurship & Leadership	3	0	3	
SEN-220	SEN-410	Software Project Management	3	0	3	
NONE	CSC-307	Professional Practices	2	0	2	
		Elective-3 (3+0 or 2+1)	3	0	3	
		Elective-4 (3+0 or 2+1)	3	0	3	

#### Semester 8:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
NONE	ESC-499	Project-II	0	3	3	12
SEN-220	SEN-420	Software Quality Assurance	3	0	3	
CEN-222	CSC-407	Information Security	3	0	3	
NONE		Elective-5 (3+0 or 2+1)	3	0	3	
<b>Total Credit Hours</b>						<b>134</b>

#### List of Electives

Pre-requisite	Course code	Course Title	Lec	Lab	CR
CSC-321	CSC-521	Advanced Design and Analysis of Algorithm	3	0	3
CSC-220	CSC-468	Advanced Databases	2	0	2
CSC-220	CSL-468	Advanced Databases Lab	0	1	1
CSC-210	CSC-444	Computer Graphics	2	0	2
CSC-210	CSL-444	Computer Graphics Lab	0	1	1
CSC-310	CSC-456	Distributed Computing	2	0	2
CSC-310	CSL-456	Distributed Computing Lab	0	1	1
SEN-320	SEN-456	Usability Engineering	3	0	3
CSC-323	CSC-451	Theory of Programming Languages	3	0	3
SEN-220	SEN-457	Software Design and Architecture	2	0	2
SEN-220	SEL-457	Software Design and Architecture Lab	0	1	1
CEN-221	CEN-460	Parallel Processing	3	0	3
CSC-220	SEN-458	Software Requirement Engineering	3	0	3
CSC-320	CEN-453	Real Time System	3	0	3
SEN-310	SEN-421	Semantic Web	3	0	3
CSC-468	CSC-452	Data Mining	3	0	3



CSC-468	CSC-454	Data Warehousing	3	0	3
CSC-444	SEN-493	Multimedia Systems	2	0	2
CSC-444	SEL-493	Multimedia Systems Lab	0	1	1
SEN-310	CSC-484	Content Management	2	0	2
SEN-310	CSL-484	Content Management Lab	0	1	1
CSC-444	CEN-444	Digital Image Processing	2	0	2
CSC-444	CEL-444	Digital Image Processing Lab	0	1	1
CSC-458	CSC-486	Geographical Information System	2	0	2
CSC-458	CSC-486	Geographical Information System Lab	0	1	1
NONE	GSC-445	Operation Research	3	0	3
SEN-213	CSC-458	Management Information System	3	0	3
CSC-210	CSC-459	Client Server Programming	2	0	2
CSC-210	CSL-459	Client Server Programming Lab	0	1	1
CEN-222	EET-455	Wireless Communications	2	0	2
CEN-222	EEL-455	Wireless Communications Lab	0	1	1
CEN-222	CEN-451	Data Encryption and Security	3	0	3
GSC-210	EEN-313	Signals and Systems	2	0	2
GSC-210	EEL-313	Signals and Systems Lab	0	1	1
EEN-222	EEN-325	Digital Signal Processing	2	0	2
EEN-222	EEL-325	Digital Signal Processing Lab	0	1	1
CEN-221	CEN-321	Microprocessor & Interfacing	2	0	2
CEN-221	CEL-321	Microprocessor & Interfacing Lab	0	1	1
GSC-121	CEN-450	Simulation and Modeling	2	0	2
GSC-121	CEL-450	Simulation and Modeling Lab	0	1	1
CSC-411	CSC-449	Neural Networks& Fuzzy Logic	3	0	3
CSC-411	SEN-455	Knowledge Based Management System	3	0	3
CSC-411	CSC-441	Natural Language Processing	3	0	3
CSC-411	CEN-458	Robotics	2	0	2
CSC-411	CEL-458	Robotics Lab	0	1	1
CSC-411	CSC-466	Introduction to Biometrics	2	0	2
CSC-411	CSL-466	Introduction to Biometrics Lab	0	1	1
SEN-310	SEN-422	Semantic Computing	3	0	3
CSC-313	SEN-448	Software Application for Mobile Device	3	0	3
CSC-313	CSC-319	Game Development and Design	2	0	2
CSC-313	CSL-319	Game Development and Design Lab	0	1	1
CSC-313	CSC-341	Mobile Application Development	2	0	2
CSC-313	CSL-341	Mobile Application Development Lab	1	0	1
CSC-220	CSC-342	Introduction to Cloud Computing	3	0	3

**Course Name: Introduction to Information and Communication Technologies**

**Credit Hours:** 3 (2+1)

**Course Code:** CSC-111

**Pre-requisite:** None

**Course Outline:**

Basic Definitions & Concepts, Hardware: Computer Systems & Components. Storage Devices, Number Systems, Software: Operating Systems, Programming and Application Software,

Databases and Information Systems, Networks, Data Communication, The Internet: Browsers and Search Engines, Collaborative Computing and Social Networking, E-Commerce, IT Security, Introduction to Programming: programming skills, flow charts, pseudopod, variables, if/else structures, loops.

**Reference Materials:**

1. *Introduction to Computers* 6th International Edition, Peter, N. McGraw-Hill
2. *Using Information Technology: A Practical Introduction to Computer & Communications*, 6th Edition. Williams, S. McGraw-Hills.
3. *Computers, Communications & information: A user's introduction*, Sarah, E. Hutchinson. Stacey, C. Swayer.
4. *Fundamentals of Information Technology*, Alexis L Mathewsleon Leon Press.

**Course Name: Professional Practices**

**Credit Hours:** 3

Course Code: CSC-307

**Prerequisites:** None

**Course Outline:**

Historical, social, and economic context of Computing (software engineering, Computer Science, Information Technology); Definitions of Computing (software engineering, Computer Science, Information Technology) subject areas and professional activities; professional societies; professional ethics; professional competency and life-long learning; uses, misuses, and risks of software; information security and privacy; business practices and the economics of software; intellectual property and software law (cyber law); social responsibilities, software related contracts, Software house organization.

**Reference Material:**

1. *Professional Issues in Software Engineering* M.F. Bott et al.

**Course Name: Introduction to Cloud Computing**

**Credit Hours:** 3

Course Code: CSC-341

**Prerequisites:** Database Management Systems

**Course Outline:**

This course covers topics and technologies related to Cloud Computing. The course will be focused on exploring solutions and learn design principles for building large network-based systems to support both computation and data intensive computing across geographically distributed infrastructure. Topics include resource management, programming models, application models, system characterisations, and implementations. An insight into deployed Cloud Computing systems, such as Amazon EC2 and S3, Microsoft Azure, Google AppEngine, Google's MapReduce, Yahoo's Hadoop is also part of this module.

**Reference Materials:**

1. Handbook of Cloud Computing, Borko Furht. Springer (2010) or Latest Edition
2. Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security, and More, Kris Jamsa Jones & Bartlett Publishers, (2012) or Latest Edition
3. Map Reduce Design Patterns, Donald Miner and Adam Shook. O' Reilly and Sons, (2012) or Latest Edition

**Course Name: Microprocessor and Interfacing**

**Credit Hours: 3**

Course Code: CEN-321

**Prerequisites:** CEN-120

**Course Outline:**

Computer Architecture and Instruction set, Memory Interfacing, IO Interfacing and Programmable IOs, Interrupts Structure, Microprocessor based Data Acquisition and Control, Microcontrollers Based Systems and Introduction to Digital Signal Processors.

**Reference Materials:**

1. Microprocessor and Interfacing, by Douglas V Hall,
2. Microprocessor, Architecture, Programming and Application" by R.S. Goonkar
3. Microprocessor System the 8086 /8088 Family" by Liu and Gibson
4. Fundamentals of Microprocessors and Microcomputers" by B. Ram

### **Curriculum Revision of MS (CS) Program**

Revision of the Curriculum is continuous process as per HEC guidelines. MS (CS) program was launched in Fall 2013 and now the first batch is at graduation stage. Curriculum revision will bring improvement in the program as well as making strong alignment of Road-Map and Curriculum of MS programs with HEC guidelines promulgated from time to time.

#### Recommendations

2. The case was presented by HOD (CS), Islamabad Campus in the FBOS meeting held on 10th March, 2016 and the following revisions are recommended for approval:

a. Revision in Core Courses:

Only two core courses are recommended as core courses along with one University Requirements course Research Methodology.

b. Adding New Elective Course "Cloud Computing"

CSC-718 Cloud Computing (3 credit hours)

### **Annexure**

#### **Proposed Revised Road Map of MS (CS)**

Course Code	Course Title	Credit Hours
<b>Semester-1</b>		
CSC-503	Advanced Theory of Computation	3
CSC-521	Advanced Design and Analysis of Algorithms	3
ESC-701	Research Methodology	3
<b>Semester-2</b>		
XXX-XXX	Elective-I	3
XXX-XXX	Elective-II	3
XXX-XXX	Elective-III	3
<b>Semester-3</b>		
XXX-XXX	Elective-IV	3
XXX-XXX	Elective-V	3
	Thesis-I/Elective	3
<b>Semester-4</b>		
XXX-XXX	Elective-VI	3
	Thesis-II/Elective	3
<b>List of Electives</b>		
CSC-504	Ubiquitous Computing	3
CSC-514	Information Retrieval Techniques	3
CSC-515	Virtual Reality	3
CSC-516	Game Theory	3
CSC-701	Computer Supported Cooperative Work	3
SEN-715	Intelligent User Interface Design and Evaluation	3
SEN-720	Advanced Human Computer Interaction	3
SEN-756	Advanced Usability Engineering	3
CSC-504	Ubiquitous Computing	3
CSC-518	Decision Support Systems	3
CSC715	Intelligent Agents	3
CSC-719	Machine Learning	3
CSC-741	Advanced Natural Language Processing	3
CEN-745	Advanced Digital Image Processing	3

CSC-750	Advanced Neural Networks and Fuzzy Logic	3
CSC-751	Pattern Recognition	3
CSC-764	Computer Vision	3
EET-519	Distributed Networking	3
EET-520	Network Administration and Management	3
EET-556	Mobile Communications and Networking	3
EET-702	Advanced Network Security	3
EET-713	Advanced Network Design	3
EET-716	Advanced Topics in Wireless Networking and Communications	3
EET-717	Network Performance Evaluation	3
EET-761	Network Protocols and Standards	3
CSC-554	Information Theory	3
CSC-746	Advanced Data Mining	3
CSC-747	Text Mining	3
CSC-752	Advanced DBMS	3
CSC-753	Distributed Databases	3
CSC-	Advanced Data Warehousing	3
CSC-755	Web based DBMS	3
CSC-756	Multimedia Databases	3
CSC-720	Advanced Operating Systems	3
CEN-720	Advanced Computer Architecture	3
CSC-781	Cloud Computing	3

**Course Name: Cloud Computing**

**Course Code: CSC-718**

**Credit Hours: 3**

**Prerequisites: NIL**

#### **Course Outline:**

This course covers topics and technologies related to Cloud Computing. The course will be focused on exploring solutions and learn design principles for building large network-based systems to support both computation and data intensive computing across geographically distributed infrastructure. Topics include resource management, programming models, application models, system characterisations, and implementations. More specifically, topics like Datacenter Architectures, Cloud Stack, Cluster File Systems, Data-flow Computation Frameworks, Big Data in the Clouds, are also discussed. An insight into deployed Cloud Computing systems, such as Amazon EC2 and S3, Microsoft Azure, Google AppEngine, Google's MapReduce, Yahoo's Hadoop is also part of this module.

#### **Reference Materials:**

1. Handbook of Cloud Computing, Borko Furht. Springer (2010) or Latest Edition
2. Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security, and More, Kris Jamsa Jones & Bartlett Publishers, (2012) or Latest Edition
3. Cloud Computing and SOA: Convergence in your enterprise, David Linthicum (2009), Addison Wesley (Latest Edition)
4. Distributed File Systems: Hadoop, Lustre, Google File System, Andrew File System, Off system, Distributed File System", Ceph. General books LLC. (2010) or Latest Edition
5. Map Reduce Design Patterns, Donald Miner and Adam Shook. O' Reilly and Sons, (2012) or Latest Edition

## Master of Science in Software Engineering

### The Case

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

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

4. Mr. Aleem was given additional duties to assist the chairman in clerical matters. The chairman of the committee presented the findings and discussion minutes are recorded. All participants' reservations are addressed and a revised and finalized roadmap is attached with this document.

### Recommendation:

The roadmap and courses revision stands approved at the level of FBOS. This roadmap, if approved by ACM, shall be effective from Fall 2016 entry onwards.

### Annexure

#### Revised Roadmap of MS (SE)

#### Mission Statement

The mission of the Masters of Science (Software Engineering) program is to equip students with theoretical and applied knowledge of software for the solution of complex problems. It is aimed to prepare the students to learn independently in a constantly changing discipline.

#### Program Objective

The objectives of MS (Software Engineering) program are:

1. Prepare students who can critically apply concepts, theories and practices to provide creative solutions of complex computing problems.
2. Prepare students who can define, plan, implement and test a medium-sized software project using appropriate software engineering processes, methods and techniques.
3. Prepare students to effectively communicate their ideas in written and electronic form, and prepare them to work collaboratively in a team environment.
4. Prepare students with a theoretical software engineering background and applied research needed to enter a doctorate program in software engineering.
5. Prepare students to join an appropriate and respectable level position in a computing-related field, and to maintain their professional skills in rapidly evolving field.

#### Admission criteria MS (Software Engineering)

Four Year degree as BS/BSE/BEE/BET/CS/SE/CE/IT or MSc in Applied Physics/Electronics or Equivalent with minimum 130 Cr Hrs and CGPA 2.5/4.0 or 50% marks. Student would be required to complete deficiency in earned credit hours, if required.

### **Road Map MS Software Engineering** **Proposed for Fall 2016**

#### **Semester 1**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
SEN-558	Advanced Requirement Engineering	3
SEN-522	Advanced Software System Architecture	3
ESC-701	Research Methodology	3
	<b>Total</b>	<b>9</b>

#### **Semester 2**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
SEN-546	Software Metrics	3
SEN-547	Software Testing and Quality Assurance	3
	Elective I	3
	<b>Total</b>	<b>9</b>

#### **Semester 3**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
	Elective II	3
	Elective III	3
ESC-600	Thesis I/ Course Work	3
	<b>Total</b>	<b>9</b>

#### **Semester 4**

<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
	Elective IV	3
ESC-600	Thesis II/ Course Work	3
	<b>Total</b>	<b>6</b>

**Total Program Credit Hours: 33**

#### **CORE COURSES**

<b>S.No</b>	<b>New Course Code</b>	<b>Course Title</b>	<b>Credits</b>
1	SEN-558	Advanced Requirement Engineering	3
2	SEN-522	Advanced Software System Architecture	3
3	SEN-547	Software Testing and Quality Assurance	3
4	SEN-546	Software Metrics	3
5	ESC-701	Research Methodology	3

#### **ELECTIVES**

<b>S. No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Credits</b>
6	SEN-756	Advanced Usability Engineering	3
7	SEN-523	Automated Software Engineering	3
8	SEN-723	Formal Methods and Specifications	3
9	CSC-720	Advanced Operating Systems	3
10	EET-710	Advanced Computer Networks	3
11	EET-702	Advanced Network Security	3
12	CSC-753	Distributed Databases	3
13	CSC-764	Computer Vision	3

14	CEN-745	Advanced Digital Image Processing	3
15	CSC-751	Pattern Recognition	3
16	CSC-744	Advanced Computer Graphics	3
17	CEN-707	Advanced Distributed Systems	3
18	CEN-553	Real Time Computer Systems	3
19	CSC-758	Parallel Processing	3
20	SEN-720	Advanced Human Computer Interaction	3
21	SEN-601	Advanced Software Project Management	3
22	SEN-758	Component-based Software Engineering	3
23	SEN-759	Software Re-Engineering	3
24	SEN-760	Complex Adaptive Systems	3
25	SEN-761	Semantic Web	3
26	SEN-762	Advanced Big Data Analytics	3
26	SEN-763	Advanced Software Engineering	3
27	SEN-754	Advanced Web Computing System and Application	3
28	CSC-759	Agent-based Modeling	3
29	CSC-708	Advanced Simulation and Modeling	3
30	CSC-521	Advanced Design and Analysis of Algorithm	3
31	CSC-504	Ubiquitous Computing	3
32	CSC-746	Advanced Data Mining	3
33	CSC-760	Advanced Data Warehousing	3
34	SEN - 764	Ontology Engineering	3
35	CEN - 720	Advanced Computer Architecture	3

**Course Title:** Advanced requirement Engineering

**Course Code:** SEN-558

**Credit Hours Theory:** (03)

#### **Course Description**

This course aims to provide in depth knowledge of Software Requirements Engineering's techniques and methodologies. The following is a list of objectives which will be achieved through this course:

- To introduce popular software requirements engineering techniques
- To familiarize students with CASE tools for software requirements engineering
- To build the skills for requirements modeling, triage and traceability in context with modern software processes

To introduce the students with ongoing research activities in the field of requirements engineering in context with emerging fields such as Service Oriented Architecture and Cloud Computing.

#### **Recommended Text Books:**

- Requirements Engineering – A Good Practice Guide by I. Sommerville & Pete Sawyer
- Software Requirements by Karl Wiegars
- Requirements Engineering Processes & Techniques by Gerald Kotonya and Ian Sommerville

**Course Title:** Advanced Software System Architecture

**Course Code:** SEN-522

**Credit Hours Theory:** (03)

#### **Aims and Objectives:**



The course teaches how large, complex software systems are designed and their system level architecture and class-level object-oriented designs are developed. There is a special emphasis on the study of architectural and design patterns: the core of solutions to commonly occurring design problems; representations of design/architecture; architectural assessment; product lines; architecture extraction; and refactoring. A very special focus will be given to the architectural patterns and state-of-the-art software architectures related to the evolving technology-spectrum. In this regard, novel concepts such as workflows, Service Oriented Architecture (SOA), Web 2.0 and Cloud Computing and large scale distributed systems will also be discussed.

Students will be given assignments based on different case studies. Students will also be required to read suggested research papers and compile their original ideas in (at least one) research paper(s)/report(s).

### **Recommended Books:**

1. Software Architecture in Practice by Len Bass, Paul Clements, Rick Kazman
2. A System of Patterns: Pattern Oriented Software Architecture by F.Buschmann et al.
3. Software Architecture: Perspectives on an Emerging Discipline by M. Shaw and G. Garlan
4. A Software Architecture Primer by [John Reekie](#) and [Rohan McAdam](#)
5. Applying UML and Patterns, by Craig Larman, Pearson Education Publishers, 2009
6. Design Patterns: Elements of Reusable Object-Oriented Software. by E. Gamma, R. Helm, R. Johnson, J. Vlissades: Addison-Wesley, 1995.

<b>Course name:</b>	<b>Software Testing and Quality Assurance</b>
<b>Course Code:</b>	<b>SEN-547</b>
<b>Credit:</b>	<b>(03)</b>

### **Overview and contents:**

This course takes off by providing an overview of fundamental notions of software testing and quality assurance techniques used to build and check quality in software systems. A particular emphasis is placed on quantitative assessment of software quality and quality control using software testing techniques. The students would not only be introduced with the theoretical background of these concepts but they would also be given hands-on experience of applying these concepts.

Once, a sound background is updated, students are focused to advanced concepts such as slicing, test suite reduction techniques, test case prioritization, TMMI, etc. The students are given sound understanding of ISO 9001:2008 and CMMI where they are able to practically implant these in their respective organizations.

This course introduces the student fundamental notions of software quality and the techniques used to build and check quality in software systems. A particular emphasis is placed on quantitative assessment of software quality and quality control using software testing techniques. The students would not only be introduced with the theoretical background of these concepts but they would also be given hands-on experience of applying these concepts. The assignments would be planned carefully to enhance students' learning of applying the learnt concepts from practical standpoint.

The assignments are planned carefully to enhance students' learning of applying the learnt concepts from practical standpoint.

### **Text:**

- Mark Utting and Bruno Legeard, "Practical Model Based Testing, A tools approach", Morgan Kaufmann Publishers is an imprint of Elsevier. 500 Sansome Street, Suite 400, San Francisco, CA 94111
- Jeff Tian, "Software Quality Engineering, Testing, Quality Assurance, and Quantifiable improvements", IEEE Computer Society

- P Ammann and J Offutt, Introduction to Software Engineering, Cambridge University Press, 2008

**Course Title:** **Software Metrics**  
**Course Code:** **SEN-546**  
**Credit Hours Theory:** **(03)**

**Course Overview & Learning Objectives:**

Offering state of the art knowledge of software measurements and best practices with emphasis on the value of software measurement as a set of pragmatic methodologies and tools for both software engineers and software project management.

After completing this course students will:

- Have a good understanding of nature and problems associated with software measurement and experimentation
- Have a working knowledge of software measurement planning and implementation (incl. data collection and analysis)
- Have a working knowledge of software size measurement (Function Point counting, etc.)
- Have a working knowledge of software cost estimation (COCOMO II model and tool, etc)
- Know concepts and examples of software resource, process, and product (i.e., product structure, complexity, quality, and reliability) measurement.

**Recommended Text Books:**

Software Metrics: A Rigorous and Practical Approach by N.E. Fenton and S.L. Pfleeger ISBN 0-534-95425-1 (1998).

Metrics and Models in Software Quality Engineering by Stephen H. Kan & Addison-Wesley ISBN 0-201 72915-6 (2002)

**Course Title:** **Advanced Usability Engineering**  
**Course Code:** **SEN 756**  
**Credit Hours Theory:** **(03))**

**Course Description:**

The objective is to introduce product's design considerations that should be taken into account right from the beginning of the product inception. Subsequently, evaluation based upon usability principles will be discussed.

**Recommended readings:**

1. D. A. Norman, The Design of Everyday Things.
2. B. Shneiderman & C. Plaisant, Designing the User Interface, 4/e, Pearson
3. Dix, Finlay, Abowd & Beale, Human-Computer Interaction, 3/e, Pearson
4. Chris Crawford, The Art of Interactive Design
5. Jakob Nielsen, Usability Engineering
6. Deborah Mayhew, The Usability Engineering Lifecycle.
7. Jakob Nielsen, Robert L. Mack, Usability Inspection Methods
8. Jeffrey Rubin, Handbook of Usability Testing.

**Course Title:** Formal Methods and Specifications  
**Course Code:** SEN-723  
**Credit Hours:** (03)  
**Aims & Objectives:**

As more complex computational systems are used within critical applications, it is becoming essential that these systems are formally specified. Such specifications are used to give a precise and unambiguous description of the required system. While this is clearly important in critical systems such as industrial process management and air/space craft control, it is also becoming essential when applications involving E-commerce and mobile code are developed. In addition, as computational systems become more complex in general, formal specification can allow us to define the key characteristics of systems in a clear way and so help the development process.

Formal specifications provide the basis for verification of properties of systems. While there are a number of ways in which this can be achieved, the model-checking approach is a practical and popular way to verify the temporal properties of finite-state systems. Indeed, such temporal verification is widely used within the design of critical parts of integrated circuits, has recently been used to verify parts of the control mechanism for one of NASA's space probes, and is now beginning to be used to verify general Java programs.

Upon completing this module, a student will understand: the principles of standard formal methods, such as Z; the basic notions of temporal logic and its use in relation to reactive systems; the use of model checking techniques in the verification of reactive systems; be aware of some of the current research issues related to formal methods.

#### **Recommended Books:**

1. "Using Z: Specification, Refinement and Proof" - J. Woodcock and J. Davies Prentice Hall, 1994.
2. "Model Checking" - E. M. Clarke, O. Grumberg, and D. Peled MIT Press, 2000.

**Course Title:** Advanced Operating System  
**Course Code:** CSC-720  
**Credit Hours Theory:** (03)

The operating systems course is of prime importance in the curriculum of any graduate or undergraduate program in computer science. This course deals with advance concepts with relevance to the graduate level study. It has been designed using references of similar courses being offered at accredited universities. The intension is to deliver the state of art operating system concepts ranging from embedded micro kernels to popular platforms like LINUX, SOLARIS, Windows 2000 and XP. The focus will be on the internals, architecture, device driver writing and the distributed processing support on multi-processor systems.

An effort will be made to conduct the course in such a way that the students get a research orientation. For this purpose state of art research articles will be reviewed and areas of further research will be identified. In some cases we may be able to come up with a research papers.

#### **Textbooks:**

- |   |    |                     |
|---|----|---------------------|
| 1. Operating Systems Principles (8 <sup>th</sup> Edition) | By | Silbershatz, Galvin |
| 2. LINUX Kernel Internals                                 | By | M.Beck, H. Boeme    |
| 3. Distributed Operating Systems                          | By | P. K. Sinha         |

**Course Title:** Distributed Databases  
**Credit Hours:** CSC - 753  
**Course Objectives:** (03)

This course outlines the advanced data models. Conceptual Database design. Concurrency control techniques. Recovery techniques. Query processing and optimization. Integrity and security. Client-Server architecture. Distributed database systems. Current trends in database systems. Database technologies, machines, modeling

**Recommended Text Books:**

- Distributed Databases: Principles and System, Ceri and Pelagatti McGraw-Hill, ISBN: 0-07-010829-3., J.N.
- Principles of Distributed Database Systems, Ozsu and Valduriez (1999), M. Tamer Ozsu, Paterick Valduriez, 2nd Edition, SpringerPaterick Valduriez, 2nd Edition, Springer

<b>Course Title:</b>	<b><i>Computer Vision</i></b>
<b>Course Code:</b>	<b>CSC 764</b>
<b>Credit Hours:</b>	<b>(03)</b>

**Aims and Objectives:**

The goal of computer vision is to make computers understand and interpret visual information. Computer vision systems bring together imaging devices, computers, and sophisticated algorithms for solving problems in areas such as industrial inspection, medicine, document analysis, autonomous navigation, and remote sensing.

**Recommended Books:**

1. *Machine Vision* by Jain, Kasturi and Schunck, IEEE.
2. D.H. Ballard, and C.M. Brown, *Computer Vision*, Prentice-Hall, 1982.
3. R.O. Duda and P.E. Hart, *Pattern Classification and Scene Analysis*, Wiley, 1973.
4. O. Faugeras, *Three-dimensional computer vision, a geometric viewpoint*, MIT Press, 1993.

<b>Course Title:</b>	<b><i>Parallel Processing</i></b>
<b>Course Code:</b>	<b>CSC-758</b>
<b>Credit Hours:</b>	<b>(03)</b>

**Aims and Objectives:**

The course teaches students the concepts of parallel processing and design issues concerning parallel programming. By the end of the course students should be able to:

- Understand parallel programming paradigms and different approaches such as shared memory, message passing, and pipelining.
- Understand and develop algorithms for selected well-known parallel problems and their solution.
- Carry out performance evaluation in parallel processing environment
- Learn methods for designing and tuning parallel algorithms.

**Recommended Books:**

1. Selim G. Akl, *The Design and Analysis of Parallel Algorithms*, Prentice Hall, April 1989.
2. Ian T. foster, *Designing and Building Parallel Programs: Concepts and Tools for Parallel Software Engineering*, Addison-Wesley Pub Co, February 1996.
3. Barry Wilkonson, *Parallel Programming Techniques and application using networks station and parallel computers*, Prentice Hall, 1999.

**Course Title:** Advanced Human Computer Interaction  
**Course Code:** SEN-720  
**Credit Hours:** (03)  
**Aims and Objectives:**

The aim of this course is to provide extensive guideline to the students for the design of computer technology, and how computer technology can be made more usable by people. It also provides to learn about cognitive science, psychology, and sociology, and stresses a principled approach to interactive systems design that fits a software engineering environment.

**Recommended Books**

1. Ben Shneiderman, Designing the User Interface: Strategies for Effective Human Computer Interaction, Third Edition Publisher.
2. Human Computer Interaction, 2/E, Alan J. Dix, Finlay E. Jawet, 2<sup>nd</sup> Edition Publisher, Human Computer Interaction.

**Course name:** Advanced Software Project Management  
**Course Code:** SEN-601  
**Credit:** (03)

**Aims and Objectives:**

This course deals with managing information technology and software development projects. It is not restricted to project managers, but encompasses the art and science of using teamwork to meet project goals. The team includes the project manager, lead developers, software engineers, supporting functions, business experts and other stakeholders. Therefore, this course is directed to students across a wide range of backgrounds and interests. The student will learn how to conceptualize, initiate, plan and execute a successful project. Students will participate in a competitive team effort to propose a major design project. Students will be able to:

- recognize the principles of general management theory which transfer to project management
- apply techniques for successfully managing a project throughout its life-cycle
- interpret the processes and knowledge areas in the Project Management Institute's *Project Management Body of Knowledge*
- formulate the determination of success as a measurable organizational value
- consider the human side of projects including participation in a team project
- understand the propositions of software design by the legendary Fred Brooks

**Textbooks**

- *Information Technology Project Management 4th edition* by Jack Marchewka. John Wiley & Sons (2012). ISBN 978-1-118-05763-6. This is a current textbook which is cross-disciplinary and addresses real issues and practices
- *The Design of Design: Essays from a Computer Scientist* by Frederick Brooks, Jr. , Pearson Education (2010). ISBN 978-0-201-36298-5. This is a readable gem about the essence and practice of software design from the author of *The Mythical Man-Month*.
- Required online sources or their URLs will be posted as needed.

**Course Title:** Component Based Software Engineering  
**Course Code:** SEN-758  
**Credit Hours:** (03)

**Course Objectives:**

The Course focuses on an approach to software development based on extensive use of pre-existing standard (or customizable) components. It also illustrates how a repository of reusable candidate components can be integrated into a typical evolutionary process model. The Component-based Software Engineering process involves identifying candidate components; qualify each component interface, and adapting components.

**Recommended Text Books:**

1. Building Reliable Component Based Software Systems, Ivica Crnkovic and Magnus Larsson, Artech House, 2002.

Object-Oriented Software Engineering: Using UML, Patterns and Java, *Bernd Bruegge and Allen H. Dutoit*, 3<sup>rd</sup> Edition, Prentice Hall, 2009

**Course name:** Software Reengineering  
**Course Code:** SEN-759  
**Credit:** (03)

**Course Objectives:**

This course covers software re-engineering techniques and tools that facilitate the evolution of legacy systems. This course is broken into three major parts. In the first part, the course discusses the terminology and the processes pertaining to software evolution. In the second part, the course provides the fundamental re-engineering techniques to modernize legacy systems. These techniques include source code analysis, architecture recovery, and code restructuring. The last part of the course focuses on specific topics in software re-engineering research. The topics include software refactoring strategies, migration to Object Oriented platforms, quality issues in re-engineering processes, migration to network-centric environments, and software integration. Students would learn:

- Introduction to software re-engineering
- Program comprehension
- Software re-engineering techniques in source code transformation and refactoring strategies
- Software metrics & quality
- Re-engineering economics
- Techniques for the migration of legacy systems into network centric environments
- Software integration issues and enabling technologies in web-enabled and distributed environments.

**Recommended Books:**

- "[Software Aging](#)", by David Lorge Parnas, International Conference on Software Engineering, 1994.
- "[Software Maintenance and Evolution: a Roadmap](#)", by K.H.Bennett and V.T Rajlich, The Future of Software Engineering, ACM Press 2000.
- "[Reverse Engineering and Design Recovery: A Taxonomy](#)", by Elliot J. Chikofsky and James H. Cross II, IEEE Software, Vol. 7, January 1990.
- "Re-engineering: Defining an Integrated Migration Framework", by William M. Ulrich, CASE: Trends Magazine, May/June 1991.
- "[A Unified Interprocedural Program Representation for a Maintenance Environment](#)", by Mary Jean Harrold, and Brian Malloy, IEEE Transactions on Software Engineering, Vol. 19, No. 6, June 1993.
- "[Interprocedural Slicing using Dependence Graphs](#)", by Susan Horwitz, Thomas Reps, and David Binkley, ACM Transactions on Programming Languages and Systems, Vol. 12, No.1, Jan. 1990.

**Course Title:** **Complex Adaptive Systems**

- Agent-Based Models (Required) Gilbert
- System Effects: Complexity in Political and Social Life (Required) Jervis

**Course Code:** **SEN 760**

**Credit Hours Theory:** **(03)**

**Course Objectives:**

The main goal of the course is to understand Complex Adaptive Systems theory and its relation to the socio-technical systems around us. Secondary goal is for the student to learn about the the basics of Agent Based Modeling.

**Recommended Text Books:**

Complex Adaptive Systems: An Introduction to Computational Models of Social Life (Required) Miller and Page

**Course Title:** **Semantic Web**

**Course Code:** **SEN-761**

**Credit Hours Theory:** **(03)**

**Course Objectives:**

Semantic Web is a group of methods and technologies to allow machines to understand the meaning – or "semantics" - of information on the Web. The participants of this course will get acquainted with the core concepts as well as application development using Semantic Web technologies.

**Recommended Text Books:**

1. Grigoris Antoniou, Paul Groth, Frank van Harmelen, Rinke Hoekstra “A Semantic Web Primer”, 3<sup>rd</sup> Edition, MIT Press 2012.

**Course Title:** **Advanced *Network Security***

**Course Code:** **EET-702**

**Credit Hours:** **(03)**

**Course Objectives:**

Organizations today are linking their systems across enterprise-wide networks and virtual private networks (VPNs), as well as increasing their exposure to customers, competitors, browsers and hackers on the Internet. Each connection magnifies the vulnerability to attack.

This course provides the fundamental knowledge students need to analyze risks to networks and systems. Students learn the steps to take in order to select and deploy the appropriate countermeasures to reduce exposure to network threats.

**Recommended Books:**

1. Network Security: Private Communication in a Public World, by Charlie Kaufman, Radia Perlman, Mike Speciner, Prentice Hall, 2002.
2. Cryptography and Network Security: Principles and Practice (3rd Edition), William Stallings, Prentice Hall; 3rd edition (August 27, 2002).

**Course Title:** **Digital Image Processing**  
**Course Code:** **CEN-472**  
**Credit Hours:** **(03)**

**Aims and Objectives:**

This course is designed to give first-year graduate students all the fundamentals in 2-D digital signal processing with emphasis in image processing techniques, image filtering design and applications.

**Recommended books:**

1. *Digital Image Processing* , R. C. Gonzalez and R. E. Woods Addison-Wesley Pub. Co., New York, (2nd edition) 2002
2. *Digital Image Processing*, Bernd Jahne, Springer-Verlag New York.
3. *Digital Image Processing Algorithms and Applications*, Ioannis Pitas, I. Pitas, Wiley, John & Sons.

**Course Title:** **RESEARCH METODOLOGY**  
**Course Code:** **ESC-701**  
**Credit Hours:** **03**

**Course overview:** 3

This course presents a basic understanding of the principles involved in the research. RM, as compared to any other engineering courses, is not a subject that one may master it by securing a good grade but it comes with experience. this course however introduces the basic logic and principal involved. it will give you an understanding of the research and your role to effectively and synergistically participate in it. Students shall be able to take on independent research tasks and will be able to produce one IEEE style conference paper.

Broadly, the course would have cover the following aspects:

- Research types and ‘The scientific method of research’
- Literature Review – Searching & Review
  - Forward and backward literature search
  - Organization of literature
  - Different between annotated bibliography and comprehensive literature review
- Research Design and Methods
- Choosing a research problem & Supervisor (MS, PhD)
- Formulating the research question, Identifying variables and generating hypothesis
- Introduction to bibliographic management tools and brief introduction on Latex
- Writing the literature review, Plagiarism and ways to avoid it
  - Introduction to ‘Turnitin’ or any other plagiarism detection tool
- Formulating the research question, Identifying variables and generating hypothesis
- Sampling: Selection of samples
- Data Analysis, Interpretation and presentation
- Thesis Manuscript writing and tool utilization (e.g. latex)
- Writing a research proposal for funding / grants
- Publishing Research in Conferences, Journals and Paper Reviewing
- Planning & Delivering Scientific Presentation



**Reference Book:**

1. The craft of Research, Third Edition(Chicago Guides to writing, Editing, and Publishing) by Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams( Apr 15, 2008).

<b>Course Title:</b>	<b>Advanced Distributed System</b>
<b>Course Code:</b>	<b>CEN-707</b>
<b>Credit Hours:</b>	<b>(03)</b>

**Aims and Objectives:**

This course aims to make the students become familiar with the advanced topics in distributed systems, starting with basic model of distributed computation, followed by algorithmic description of logical clocks, snapshot recording, message passing and group communication, and how to reach to a consensus. The course will also focus on Multiagent Systems as design tool for Complex Adaptive Systems. More emphasis will be on algorithms of leader selection and agreement. Distributed models of decision making of agents such as Swarm Intelligence and Game Theory will also be explored. The course will also focus on Systems side of the domain, with System Modeling, Clustering and Virtualization, Computing Clouds, Grids, P2P, and The Future Internet (IoT).

- Distributed Computing: Principles, Algorithms, and Systems, by Ajay D. Kshemkalyani, Cambridge University Press
- Distributed and Cloud Computing: From Parallel Processing to the Internet of Things, by Geoffrey C. Fox, Jack Dongarra, and Kai Hwang, Elsevier Science
- A Concise Introduction to Multiagent Systems and Distributed Artificial Intelligence by Nikos Vlassis

<b>Course Title:</b>	<b>Advanced Big Data Analytics</b>
<b>Course Code:</b>	<b>SEN-762</b>
<b>Credit Hours:</b>	<b>(03)</b>

**Course Objectives:**

This course shall provide the fundamental knowledge to equip students being able to handle those challenges. This discipline inherently involves many fields. Because of its importance and broad impact, new software and hardware tools and algorithms are quickly emerging. A data scientist needs to keep up with these ever changing trends to be able to create a state-of-the-art solution for real-world challenges.

This Big Data Analytics course shall first introduce the overview applications, market trend, and the things to learn. Then, students shall be introduced fundamental platforms, such as Hadoop, Spark, and other tools, such as IBM System G for Linked Big Data. Afterwards, the course will introduce several data storage methods and how to upload, distribute, and process them. This shall include HDFS, HBase, KV stores, document database, and graph database. The course will go on to introduce different ways of handling analytics algorithms on different platforms. Then, students shall introduce visualization issues and mobile issues on Big Data Analytics. Students will then have fundamental knowledge on Big Data Analytics to handle various real-world challenges.

Afterwards, the course will zoom in to discuss large-scale machine learning methods that are foundations for artificial intelligence and cognitive networks. The course will discuss several methods to optimize the analytics based on different hardware platforms, such as Intel & Power chips, GPU, FPGA, etc. The lectures will conclude with introduction of the future challenges

of Big Data, especially on the ongoing Linked Big Data issues which involves graphs, graphical models, spatio-temporal analysis, cognitive analytics, etc.

Given large amount of data, one fundamental scientific challenge is how to develop efficient and effective computational tools to analyze the data, revealing insight and make predictions. Data analytics is the science of achieving these goals. It is an inter disciplines of machine learning, data mining, statistics, and so on. This class aims to provide an overview of advanced machine learning, data mining and statistical techniques that arise in data analytic applications. In this class, you will learn and practice advanced data analytic techniques, including: parallel algorithms, online algorithm, locality sensitive hashing, topic modeling, structure learning, and time-series analysis.

#### **Reference Book:**

- C. Bishop, Pattern Recognition and Machine Learning, Springer 2007.
- All of statistics: a concise course in statistical inference. Larry Wasserman. Springer, 2004.
- Trevor Hastie, Robert Tibshirani, Jerome. H. Friedman. The elements of statistical learning: data mining, inference and prediction. Springer, 2009

<b>Course Title:</b>	<b>Advanced Web Computing System and Application</b>
<b>Course Code:</b>	<b>SEN-754</b>
<b>Credit Hours:</b>	<b>(03)</b>

#### **Course Objectives:**

The course aims to enable students to understand the emerging trends in the Web application development. It will enable students to understand the core issues related to the development of systematic, cost effective and quality Web application.

#### **Recommended Text Books:**

1. Gerti Kappel, Birgit Proll, Siegfried Reich, Werner Retschitzegger “Web Engineering The Discipline of Systematic Development of Web Applications”, John Wiley & Sons, 2006
2. Sven Casteleyn, Florian Daniel, Peter Dolog, Maristella Mater, “Engineering Web Applications”, Springer 2009

#### **Reference Books:**

Relevant research papers from leading journals.

<b>Course Title:</b>	<b>Advanced Software Engineering</b>
<b>Course Code:</b>	<b>SEN - 763</b>
<b>Credit Hours:</b>	<b>(03)</b>

#### **Aims & Objectives:**

To develop a systematic approach to software development using the object-oriented paradigm. The student should be able to fully understand the fundamental concepts, benefits and applicability of object-orientation. The student should gain application experience of the concepts through use of an object-oriented analysis and design methodology and software development in an object-oriented language.

#### **Recommended Books:**

- Ivar Jacobson, Object-Oriented Software Engineering: A Use Case Driven Approach (Addison-Wesley Object Technology Series), Addison-Wesley.
- Bernd Bruegge, Allen H. Dutoit, Object-Oriented Software Engineering: Conquering Complex and Changing Systems, 1/e, Prentice Hall, 2000.
- Grady Booch, Object Oriented Analysis and Design, Addison-Wesley.

**Course Title:** Advanced Data Mining  
**Course Code:** CSC-746  
**Credit Hours:** (03)

### **COURSE OBJECTIVES**

The objective of the course is to create awareness amongst the students about different aspects of data warehousing. The course will also introduce students to the basic concepts and techniques of data mining. The aim is to develop skills of using recent data mining software for solving practical problems and to gain experience of doing independent study and research.

### **Recommended Books:**

1. Data Warehousing Fundamental by Paulraj Pooniah  
Data Mining Concepts & Techniques by Jaiwei Han, Micheline Kamber
2. Tutorial on Data Mining by Eamonn Keogh

### **Reference Book:**

1. Information Systems Reengineering and Integration” by Joseph Fong, published by Springer Verlag, 2006, ISBN 978-1-84628-382-6, Second edition

**Course Title:** Advanced Data Warehousing  
**Course Code:** CSC-760  
**Credit Hours:** (03)

### **Course Objectives:**

This course will be an introduction to data mining and Data Warehousing (Taught Course). The course will be taught through lectures, with class participation expected and encouraged. There will be frequent reading and practical assignments to supplement the lectures. Core focus of the subject will be on learning data mining & DW techniques.

### **.Recommended Text:**

1. [Jiawei Han](#) and Micheline Kamber, [Data Mining: Concepts and Techniques](#), The Morgan Kaufmann Series in Data Management Systems, Jim Gray, Series Editor. [Morgan Kaufmann Publishers](#), August 2000. 550 pages. ISBN 1-55860-489-8.
2. *Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals*. Paulraj Ponniah
3. Data Warehousing in the Real World: Saam Anahory and Dennis Murray
4. The Data Warehousing Toolkit: Ralph Kimball and Margy Ross

You might also find the following useful (it is the companion book to [WEKA](#), which will be used for course projects):

5. Richard J. Roiger and Michael W. Geatz, Data Mining: A Tutorial Based Primer, [Pearson Education](#), 2007.
6. Ian H. Witten and Eibe Frank, [Data Mining: Practical Machine Learning Tools and Techniques with Java Implementations](#), [Morgan Kaufmann Publishers](#), October 1999. 371 pages. ISBN 1-55860-552-5.

**Course Title:** Real-Time Computer Systems  
**Course Code:** CEN-553  
**Credit Hours:** (03)

**Aims & Objectives:**

The objective of this course is to provide an introduction to the whole area of real-time computing.

**Recommended Books:**

Liu, Jane W. S., Real-Time Systems: 1/e , Prentice Hall, 2000.  
Nissanke, Nimal, Real Time Systems: An Introduction: 1/e, Prentice Hall, 1997.  
Goldsmith, Sylvia, Practical Guide To Real-Time Systems Development, A: 1/e, Prentice Hall, 1993.  
Andy Wellings and Burns, Real-Time Systems, Prentice Hall.

**Course Title:** Advanced Design and Analysis of Algorithms  
**Course Code:** CSC-521  
**Credit Hours:** (03)

**Course Objectives:**

Algorithm design and analysis is a fundamental and important part of computer science. This course introduces students to advanced techniques for the design and analysis of algorithms, and explores a variety of applications.

**Reference Books:**

Vijay Vazirani, Approximation Algorithms, Springer, 2001. M  
Michael Mitzenmacher and Eli Upfal, Probability and Computing, Cambridge University Press, 2005.  
Allan Borodin and Ran El-Yaniv, Online Computation and Competitive Analysis, Cambridge University Press, 2005.  
Michael Kearns and Umesh Vazirani, An Introduction to Computational Learning Theory, The MIT Press, 1994.

**Course Title:** Advanced Simulation and Modeling  
**Course Code:** CSC-708  
**Credit Hours:** (03)

**Course Objectives:**

As simulation is increasingly applied to more complex applications, exploiting efficiencies in model design and model execution becomes a challenging task. The aim of this course is to provide students with the ability to model, simulate and analyse complex systems in a reasonable time. This course is divided into three parts and covers advanced techniques in simulation model design, model execution and model analysis. A selection of model design techniques such as conceptual models, declarative models, functional models, constraint models, and multi-models will be discussed. Model execution techniques include discussion of serial and parallel discrete-event simulation algorithms. For model analysis, topics include input-output analysis, variance reduction techniques and experimental design.

Present concepts of computer-based modeling and simulation applicable to various domains of engineering and science. Provide theoretical concepts, methods, and hands-on experience with object-oriented modeling and simulation. Students are expected to gain a solid foundation and associated experience for computer-based tool set for constructing, simulating and analyzing models of complex systems.

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**Recommended Text Books:**

- "Parallel and Distributed Simulation Systems" by R.M. Fujimoto, John Wiley, 2000.
- "Discrete-Event System Simulation" by J. Banks, J. Carson and B. Nelson, 2nd edition, Prentice Hall, 1996.
- or "Simulation Modeling & Analysis" by A. Law and D. Kelton, McGraw Hill Publishing Co., 1991
- "Simulation Model Design and Execution: Building Digital Worlds" by P. Fishwick, Prentice-Hall, 1995.

<b>Course Title:</b>	<b>Agent Based Modeling</b>
<b>Course Code:</b>	<b>CSC-759</b>
<b>Credit Hours:</b>	<b>(03)</b>

**Course Objectives:**

You will become familiar with the basic ideas, methods, and programming skill required for agent-based modeling. You will also learn how to apply these ideas and techniques to the study of social, technological and socio-technical systems..

**Recommended Text Books:**

Agent-Based and Individual-Based Modeling: A Practical Introduction Steven F. Railsback and Volker Grimm. 2012, Princeton and Oxford: Princeton University Press

<b>Course Title:</b>	<b>Ontology Engineering</b>
<b>Course Code:</b>	<b>SEN - 764</b>
<b>Credit Hours:</b>	<b>(03)</b>

**Course Objectives:**

The unit will provide students with a theoretical and practical understanding of leading edge solutions for the Semantic Web. It will introduce students to the W3C standard Web Ontology Language, OWL, and its underlying Description Logics. It will provide students with experience using a set of established patterns for developing OWL ontologies and help them to learn to avoid the major pitfalls in using OWL. It will give them an opportunity to become familiar with a widely used environment for developing and an API for applying OWL ontologies, and making use of reasoning services accessible via both.

Ontologies provide rich, expressive vocabularies of terms describing a domain (e.g. medicine, astronomy, music etc.) They are key to development of the next generation of the Web, support a number of activities such as information exchange, data integration and search. This unit will provide an introduction to OWL, a standardized language for the representation of ontologies. It will cover the syntax and semantics of the language; authoring ontologies (including the use of standard design patterns); the use of reasoning and the use of ontologies in applications

<b>Course Title:</b>	<b>Advanced Computer Architecture</b>
<b>Course Code:</b>	<b>CEN - 720</b>
<b>Credit Hours:</b>	<b>(03)</b>

**Course Objectives:**

This course builds on the Computer Architecture concepts, it covers advanced features in state of art CPUs and their design and evaluation. The topics covered include instruction set design, micro programmed CPU design, pipelining, instruction-level parallelism, high-speed memory systems, storage systems, interconnection networks, and multiprocessor architectures. The fault tolerance, real time systems and multimedia systems along with case studies of intel Pentium 4, SunSparc and DEC Alpha are introduced. The new domains like multi core processors and use of programmable hardware for ASIC or FPGA designs are also discussed.

**Reference Texts:**

- Computer Architecture: A quantitative approach By J.I. Hennessy and D.A. Patterson
- Advanced Computer Architecture, Parallelism, Scalability and Programmability By Kai Hwang, Mc Graw Hill publication.
- Advanced Computer Architecture and Parallel Processing By Hesham El-Rewini, Mostafa Abd-El-Barr John Wiley

## **Revision and realignment of MS EM Roadmap**

### **The Case**

5. Department of Software engineering requested HEC for approval to launch MS EM program at BUIC and it was subsequently approved. The first batch of MS EM students was taken in Spring 2016. In order to review and improve MS EM curriculum, a departmental committee headed by Dr. Awais Majeed was formed and the following members were included:

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

6. A meeting was convened where Dean (ES) was requested along with all HODs and a faculty members were requested through a memo from SE, CE, EE and Management sciences to help improve the roadmap. Their comments and suggestions are incorporated in the finalized roadmap.

7. Mr. Aleem was given additional duties to assist the chairman in clerical matters. The chairman of the committee presented the findings and discussion minutes are recorded. All participants' reservations are addressed and a revised and finalized roadmap is attached with this document.

### **Recommendation:**

The roadmap and courses revision stands approved at the level of FBOS in consultation with Dean (MS). This roadmap, if approved by FBOS and subsequently by ACM, shall be effective from Spring 2016 entry onwards.

### **Annexure**

## **Revised Roadmap for MS(EM)**

### **1. Introduction**

Department of Software Engineering intends to offer masters degree in Engineering Management (MS-EM). The main aim of this program is to equip graduates with essential Engineering processes management skills that are needed in industry to enable them to perform in a global engineering environment. These skills would include:

- Decision and Risk Analysis
- Systems Modelling, Design and Optimization
- Engineering Project Management
- Supply Chain and Logistics Engineering
- Quality Engineering
- Information and Knowledge management
- Manufacturing and Maintenance Management

- Energy Systems Design and Planning
- Communication Systems and Technology Management
- Understanding of Global Business Dynamics

The program will follow a multi-disciplinary approach enabled through a flexible curriculum realized by a keen and thoughtful collaboration within Engineering, Management and Social disciplines of Bahria University (BU).

## **2. Program Aims, Objectives and Expected Benefits**

Every day, business leaders make critical decisions on managing their organizations without truly understanding the second- and third-order effects of those decisions. At the same time, accomplished engineers produce ideas on changing the world through innovation, but aren't able to navigate barriers to their implementation from business leaders and government.

In a world of increasing speed of change and technology evolution, the challenges facing today's international society are increasingly complicated—and so are the solutions required to meet them. While creating such systemic solutions requires expertise in traditional business, management, and engineering practices, effective leadership must adopt cross-discipline approaches to support true collaboration and minimize the tendency toward reductionist rather than holistic solutions.

Successful leaders must understand and manipulate the inter-relationships between engineering, business, and policy considerations in order to achieve solutions that will meet technical and financial requirements while adhering to governance and policy constraints.

### **2.1 Program Aims and Objectives**

Engineering management incorporates the leadership skills and concepts from engineering, business, and governance to develop and manage real solutions to complicated, evolving problems. The individuals that work in this field are systems thinkers who view problems and solutions through a holistic lens, striving to create a systems solution that incorporates evolution and adaptation as a key attribute, rather than struggling simply to interface individually engineered components.

This program would aims to

- Approach each phase of the solution life cycle with the ultimate goal of balancing the risks, needs, and desires of the stakeholder community and producing a successful, sustainable system.
- Develop an educational experience that prepares successful leaders for the real world of emerging problems, evolving technologies, and growing complexity in the global community.

The proposed program would bear following objectives:

- Emphasizing, developing and applying big-picture thinking to manage critical challenges around the world
- Concentrating less on technical and mathematical components than a typical engineering degree, while providing fundamental systems engineering skills



- Extending benefits students from various backgrounds—including consulting, healthcare, government, and finance—not just engineers
- Providing unique opportunities to participate in and contribute to cutting-edge research and industry innovation

## **2.2 Benefits to the Society**

The proposed program would immerse the students at the intersection of policy, business strategy and leadership, and engineering, providing them with the critical skills they need to address the global challenges of today and pioneer the solutions of tomorrow.

Students will not only strengthen their existing skill sets, but also develop new competencies that were previously outside of their scope of knowledge. They will leave the program with a practical toolset that can be adapted to various industries and applications, allowing them to work seamlessly across areas of expertise and placing them in high demand in a growing marketplace.

## **3. Admission Requirements**

Applicants must follow all the requirements laid down for MS programs in BU, which include:

1. Bachelor degree or its equivalent in engineering or related scientific field from an accredited institution.
2. Cumulative minimum baccalaureate grade point average of 2.5.
3. Official transcript(s) for all post-secondary coursework.
4. GAT result with at least 50% or more

Additionally, applicants must provide HEC verification of all academic certificates / degrees.

## **4. Degree Requirement**

Thirty-three semester hours of approved graduate work within one of two options would require students to complete this degree in not less than two years and not more than three years.

The students would also require to either freeze a semester through written application should they require a semester leave within the course of their degree.

### **4.1 Option 1**

This option is based on a successful completion of 33 semester hours of graduate-level coursework without thesis option. The curriculum consists of four core courses and seven additional courses within specializations (as Technology Management, Systems Management, and Engineering Management) selected from an approved list of electives.

### **4.2 Option 2**

This option is based on a successful completion of 27 semester hours of graduate-level coursework and 6 hours of thesis research. The curriculum consists of four core courses and five additional courses within specializations (as Technology Management, Systems Management, and Engineering Management) selected from an approved list of electives.

Students are expected to complete a plan of study that identifies a concentration such as technology management, Systems Engineering, software project management for purposes of pursuing the Master of Engineering in Engineering Management.

## 5. Core Courses and Specializations

Engineering Management is at the intersection of science, engineering, management and behavioural science. It is a critical element in corporate and national competitive strategies. Managing technology is a powerful tool companies use to compete in an increasingly challenging global economy. It requires an understanding of how science becomes a technology, how technologies are developed into products and how products meet market demands. It also requires understanding how companies control their internal functions to exploit new technologies and markets. This program addresses the role new technology manager's play in technology based businesses.

### 5.1 Core Courses for MS-EM

The following are the core courses for MS-EM program:

Code	Course Title	Credit Hours
EMG-601	Engineering Project Management	03
EMG-602	Business Process Analysis and Development	03
EMG-603	Finance for Engineers	03
EMG-604	Quality Engineering	03

The following is university core:

Code	Course Title	Credit Hours
ESC-701	Research Methodology	03

### 5.2 Electives for Specializations

MS-EM program offers several soft streams of specialization. All courses in this program are designed to meet the scope and current trends of industry and market requirement. Students can also take courses from multiple streams which will help them to broaden their area of knowledge. It is pertinent to highlight that these are soft specializations streams that would enable students to develop competencies in a specific area and will not be declared on the final transcript and degree certificate. The specializations would equip the students so that they may be able to better select technical opportunities and understand organizational challenges that prevent these techniques from being successful.

These specializations would also equip the students to become effective information system managers and help develop Pakistan's 'knowledge economy'. Primary objective of this specialization is to provide students with a deep understanding of what is involved in the Management of engineering institutions and organizations. This would be accomplished by reviewing a set of conceptual frameworks of engineering management, and by developing a critical view of two levels of management -- strategic and tactical. The strategic content will feature a broad review of significant management challenges before proceeding into assessing value of enabling applications through case studies and empirical research articles. The tactical content will focus on a triad which gives a basic foundation in engineering organizations including technology, general organizational challenges (e.g., governance, sourcing), and specific skills in managing engineering projects. The courses in this category are given below in such a way that the broad category of soft specialization is discussed as headline and the courses in that category are presented as a common table below:

Course Code	Course Title	Proposed Credit Hrs
<b>1. Engineering, Production and Manufacturing Management</b>		
OPM – 611	Operations and Production Management	03
SCM-510	Supply Chain Management	03
SCM-512	Total Quality Management	03
EMG -605	Forecasting and Decision Making	03
EMG -606	Quality and Manufacturing Management	03
<b>2. Energy Management and Urban Planning</b>		
EMG - 607	Management in Global Energy Industry	03
EMG -608	Business Policy and Regulations in Global Energy Industry	03
EMG -609	Traffic Engineering	03
EMG -610	Urban and Regional Planning	03
<b>3. Organizational Management</b>		
EMG-611	Entrepreneurship in Engineering Concerns	03
HRM 648	Organizational Development	03
EMG -612	Marketing Management for Engineering Concerns	03
EMG -613	Advanced Statistical Methods for Engineering Research	03
MGT-662	Strategic Management	03
EMG -614	Innovation and Technology Management	03
FIN-681	Financial Risk Management	03
SCM-512	Engineering Laws and Contract Management	03
EMG -615	Human Resource Management and Corporate Social Responsibility	03
EMG -616	Systems Thinking	03
<b>4. Information, Knowledge and Software Management</b>		
SEN-762	Advanced Big Data Analytics	03
EMG -617	Information Systems Management	03
EMG -618	Enterprise Systems and Audit	03
EMG -619	Information Systems Strategy and Innovation	03
EMG -620	Information Systems Security and Ethics	03
SEN-756	Advanced Usability Engineering	03
EMG -621	Socio-Technical Systems	03
CSC 518	Decision Support Systems	03
SEN - 658	Systems Requirement Engineering	03
SEN - 621	Advanced Software and System Architecture	03
SEN - 523	Automated Software Engineering	03
CSC - 746	Advanced Data Mining and Warehousing	03
SEN - 647	Advanced Software Project Management	03

## 6. Roadmap for MS-EM

The MS-EM program is divided into four semesters. The first semester mainly comprises of core courses, in addition to a university requirement course for the program. In semester two and three, a student is supposed to acquire competency by choosing appropriate elective

courses in the area of interest. In the final semester, a student may opt to undertake research work (i.e. thesis) or study elective appropriate courses for his/her area of specialization.

#### Semester 1

Course Code	Course Title	Credits
	Core – I: Engineering Project Management	3
	Core – II: Business Process Analysis and Development	3
	Core – III: Research Methods	3
<b>Total</b>		<b>9</b>

#### Semester 2

Course Code	Course Title	Credits
	Core – IV: Finance for Engineers	3
	Core – V: Quality Engineering	3
	Elective – I	3
<b>Total</b>		<b>9</b>

#### Semester; 3

Course Code	Course Title	Credits
	Elective – II	3
	Elective – III	3
ESC-500	Thesis I/ Course Work (Elective – III)	3
<b>Total</b>		<b>9</b>

#### Semester 4

Course Code	Course Title	Credits
	Elective – IV	3
ESC-500	Thesis II/ Course Work (Elective – V)	3
<b>Total</b>		<b>6</b>

**Course Title:** **Engineering Project Management**  
**Course Code:** **EMG - 601**

Introducing the systems, tools and techniques that can be used to facilitate the management of engineering projects, enabling you to take an informed view on how to successfully deliver, manage and control a project. The course clearly demonstrates the range of systems that can be deployed, providing a structured approach to delivery and for managing the many issues that inevitably arise throughout the project life-cycle. It will be equally useful to engineers new to project and construction management, and those with previous experience.

#### Recommended Texts

- “Rapid Development”, Steve McConnell “Information Technology Project Management”, Kathy Schwalbe
- “Quality Software Project Management”, D. Shafer
- “Software Project Survival Guide”, Steve McConnell

**Course Title:** **Business Process analysis and Development**  
**Course Code:** **EMG - 602**

**Credit Hours: Three (3)**

This course is the foundation for all courses in the Business Process Management curriculum and is required for CEG BPM certification. It provides an overview and discussion of the principles, concepts and techniques required to transform your business from a traditional, functional organization to a process-centric organization. The course introduces a systematic approach and methodology for planning, monitoring, measuring and managing your company business process performance and for redesigning and improving specific processes. BPM is a must for everyone interested in business process improvement. Designed for business managers, business analysts, and practitioners involved in process-based change and the automation of process solutions. This course is the foundation for all other courses in the CEG BPM curriculum. It establishes a methodology, a common language, and a baseline for all other courses in the curriculum.

**Recommended Texts**

- Business Process Management - Fundamental Level Tim Weikiens, Christian Weiss, Andrea Grass.

<b>Course Title:</b>	<b>Finance for Engineers</b>
<b>Course Code:</b>	<b>EMG - 603</b>
<b>Credit Hours Theory:</b>	<b>Three (3)</b>

Course Overview: This course presents data analysis and econometric modeling using applications in finance. Equivalently, this course is an introduction to computational finance and financial econometrics. As such, the course utilizes concepts from microeconomics, finance, mathematical optimization, data analysis, probability models, statistical analysis, and econometrics.

The emphasis of the course will be on making the transition from an economic model of asset return behavior to an econometric model using real data. This involves: (1) specification of an economic model; (2) estimation of an econometric model; (3) testing of the assumptions of the econometric model; (4) testing the implications of the economic model; (5) forecasting from the econometric model. The modeling process requires the use of economic theory, probability models, optimization techniques and statistical analysis.

Topics in financial economics include asset return calculations, portfolio theory, index models, the capital asset pricing model and investment performance analysis. Mathematical topics covered include optimization methods involving equality and inequality constraints and basic matrix algebra. Statistical topics to be covered include probability and statistics (expectation, joint distributions, covariance, normal distribution, sampling distributions, estimation and hypothesis testing etc.) with the use of calculus, descriptive statistics and data analysis, linear regression, basic time series methods, the simulation of random data and re-sampling methods.

**Required Texts**

An Introduction to Computational Finance and Financial Econometrics by Eric Zivot, manuscript in preparation (see the [Notes](#) page for preliminary chapters)

[Statistics and Data Analysis for Financial Engineering](#) by David Ruppert, Springer-Verlag. [Book website](#). The UW library has access to the UseR series of books from Springer-Verlag. If you have a UW net ID then you can get access to these ebooks through the UW library page. If you are connecting from a computer that is off campus be sure to use the Off Campus login link. A direct link to Statistics and Data Analysis for Financial Engineering is [here](#).

[A Beginner's Guide to R](#) by Alain Zuur, Elena Ieno and Erik Meesters, Springer-Verlag. A direct link to A Beginner's Guide to R is [here](#)  
[R Cookbook](#) by Paul Teetor, O'Reilly.

**Course Title:** **Quality Engineering**

**Course Code:** **EMG - 604**

**Credit Hours Theory:** **Three (3)**

This course outlines the Quality Engineer Body of Knowledge, which outlines specific areas of expertise. These include training in quality management systems (QMS) and the students will learn essential information about quality systems, auditing, product and process control and design, quality methods and tools, technologies, applied statistics, System Engineering, SPC, and Design of Experiments. Further, the quality engineer must understand the quality system, quality standards and regulations. On successful completion of this course students will be able to:

- Understand the relationship of the quality engineer to the quality system.
- Analyze the relationship of statistics to a process.
- Understand basic quality management principles.
- Understand process capability and use statistical process control to monitor a process.
- Generate acceptance sampling plans and identify and use technical quality tools.
- Incorporate quality technology in design, customer-supplier relationships, Reliability, Availability, and Maintainability (RAM), materials control, measurement, auditing, quality costs and document control within a quality system w.r.t ISO.
- Apply problem-solving tools and Software Engineering methodologies, process control and process capability plans, acceptance sampling, product quality and attribute controls.

**Course Title:** **Operations and Production Management**

**Course Code:** **OPM - 611**

**Credit Hours Theory:** **Three (3)**

Concepts, problems and techniques applicable to the operations of a variety of business organizations. The emphasis is on decision making (to include business ethics) in operational areas such as: facility requirements and utilization, control and coordination of resource inputs and outputs, types of transformation / conversion processes, and performance measurements.

### **Recommended Texts**

- Operations Management, Focusing on Quality and Competitiveness; Second edition, Roberta S. Russell & Bernard W. Taylor III, Prentice Hall, 1998

**Course Title:** **Supply Chain Management**

**Course Code:** **SCM - 510**

**Credit Hours Theory:** **Three (3)**

A major theme of this course is to study various aspects of supply chain, its objectives, decision phases, strategies and designs, planning, forecasting, operation processes, cycle view, push/pull view, macro processes, performance achievement, strategy into action (SIA), must win battles, coordination internally & externally, uninterrupted supplies, warehousing and transportations, profit improvement plans and finally a cost effective business

### **Recommended Texts**

- Purchasing and Supply chain management, 2nd edition, Monczka, Trent, Handfield, Prentice Hall

**Course Title:** Total Quality Management  
**Course Code:** SCM - 512  
**Credit Hours Theory:** Three (3)

This course provides an overview to concepts, methods, activities, and philosophy of business in the world today. It covers contemporary trends in business, while introducing the student to the language, principles, and environment of business. Salient features include :

- Managing within the dynamic business environment,
- How economics affects business
- Competing in global markets
- Demonstrating ethical behaviour and social responsibility
- Entrepreneurship and starting a small business
- Leadership and management
- Product development
- Project management Marketing
- Understanding financial information and accounting

#### **Recommended Texts**

- “Quality Software Project Management”, D. Shafer
- “Guiding principles for applications”, Jack P. Peter

**Course Title:** Forecasting and Decision Making  
**Course Code:** EMG - 605  
**Credit Hours Theory:** Three (3)

Forecasts and budgets are essential tools for successful business management. Understanding and using these management tools will facilitate effective decision making and strategic planning and ultimately support growth and development. Participants will be required to complete a pre-course assignment prior to attending the course. This assignment is designed to directly relate the course to participants' personal experience and provide practical application of the course outcomes.

#### **Recommended Texts:**

- Decision Making and Forecasting: With Emphasis on Model Building and Policy Analysis by Kneale T. Marshall

**Course Title:** Quality and Manufacturing Management  
**Course Code:** EMG - 606  
**Credit Hours Theory:** Three (3)

Quality Management Systems is intended for anyone working in any manufacturing or service sector where a structured approach to product/service quality and customer satisfaction is important. It is ideally suited for those who have some experience of worklife at any level and who now wish to develop a deeper understanding of the standards and approaches that facilitate and maintain quality at process and organizational level. The primary emphasis of the course is on the ISO9000 family of Quality Management System standards but it also looks at equivalent standards in the automotive, pharmaceutical, medical device and food sectors. Related systems such as Environmental and Health and Safety get a mention in terms of similarity and opportunities for integration.

### **Recommended Texts**

- Competitive Manufacturing Management By Nicholas
- ISO9000 Family of Quality Management System Standards.
- Sector specific Quality Management System Standards.
- Health & Safety and Environment Standards.

**Course Title:** **Management in Global Energy Industry**

**Course Code:** **EMG - 607**

**Credit Hours Theory:** **Three (3)**

Students would understand the role regulation plays in determining how the energy industry addresses the key energy challenges. Students would take a broad perspective across the energy industry, reviewing the activities and challenges faced by the various sectors. Work in a group on a business simulation that illustrates how risks and uncertainties have to be incorporated into the way managers guide a company. This will both bring to life a key part of the industry and illustrate the importance of effective teamwork in managerial decision-making. Students would learn to understand the concepts underlying the production/operations function. You will learn to appreciate the different nature of the tasks and issues involved in managing the production function in a manufacturing company and the operations function in a service organization.

**Course Title:** **Business Policy and Regulations in Global Energy Industry**

**Course Code:** **EMG - 608**

**Credit Hours:** **Three (3)**

Overview: Understanding diverse and integrated markets for primary energy, and the essential considerations driving business leaders and policy makers in development of global energy resources. This course provides an understanding to the business of primary energy production. We will examine the nature of demand and supply in global energy markets, and business considerations for participants in those markets. Students taking this course will be able to identify the distinctive challenges facing enterprises engaged in development of primary energy resources. The course is intended to provide a broad perspective of the challenges for businesses and policy authorities engaged in diverse but integrated global energy markets.

### **Recommended Texts:**

- Global Energy Dilemmas by Mike bradshaw
- Business Policy and Strategic Management by G.V SatyaSekhar

**Course title:** **Traffic Engineering**

**Code:** **EMG 609**

**Credit:** **03**

Traffic operations of roads, streets, and highways; traffic engineering studies; use of signs, signals, and pavement markings as traffic control devices; highway and intersection capacity, design and operations of traffic signals; current microcomputer models and applications. Understand the general characteristics related to main components of the highway system such as road users, vehicles, traffic and control systems, and various interactions among those components. Perform capacity analysis of rural highways, freeways, signalized intersections, and unsignalized intersections using the procedures described in the current version of the Highway Capacity Manual. Perform the capacity analysis of highway facilities by using the Highway Capacity Software. Understand highway safety related issues, calculate and interpret



highway crash frequencies and rates, perform the methods to identify critical highway locations, and suggest applicable countermeasures.

### **Recommended Texts:**

- Traffic Engineering, Roess, Prassas, & McShane, Third Edition, Pearson/Prentice Hall, (Optional) Traffic Engineering Handbook, 5th Edition, Institute of Transportation Engineers (1999)

**Course title:** **Urban and Regional Planning**

**Code:** **EMG 610**

**Credit:** **03**

Understanding urban processes and contributing to sustainable urban development, Urban transport, infrastructure and social services, quality of urban life, urban modeling, planning and evaluation approaches as well as disaster risk management, urban environmental planning, and participatory GIS are typical themes in the urban planning and management course domain. Be able to identify key concepts in urban and regional planning. Understand the general planning process. Have a basic understanding of the major planning issues and debates. Be able to understand and apply planning principles to problems in land use planning, environmental planning, and economic development. Be able to acquire and analyze the essential data used in urban and regional planning. Identify a planning problem in a city YOU are familiar with and use planning concepts to solve the problem

### **Recommended Texts**

- The Urban and Regional Planning Reader, Eugenie L. Birch (editor): London & New York: Routledge, 2009
- The Regional City: Planning For the End of Sprawl, P. Calthorpe and W. Fulton., Washington, DC: Island Press, 2001.
- The Small Town Planning Handbook, 2nd edition. T. L. Daniels, J.W. Keller, and M. B. Lapping. Chicago, IL: American Planning Association, 1995

**Course Title:** **Entrepreneurship and Engineering Concerns**

**Course Code:** **EMG - 611**

**Credit Hours:** **Three (3)**

This course is for students who want to build creative businesses in new or existing firms; foster effective, innovative work in the people they lead; and preserve their own creativity in the face of career pressures and organizational constraints. This course is designed to help you develop your own creativity, apply creative ideas in entrepreneurial ventures, and support the creativity of the people you lead. You will learn to recognize, analyze, and support creative behavior in organizations in a wide variety of industries.

### **Recommended Texts**

- Entrepreneurship: Strategies and Resources by Marc J. Dillinger, Third Edition (Pearson Education
- Essentials of Entrepreneurship and Small Business Management, Thomas W. Zimmerer, Norman M. Scarborough, Pearson Education
- Bradford, D.L. & Burke, W. W. (2005). Reinventing organization development: New approaches to change in organizations. California: Pfeiffer

**Course name:      Organizational Development**

**Course Code:      HRM 648**

**Course credit:      03**

Organization Development (OD) is an area of practice and research in Human Resource Development (HRD). According to Cummings & Worley, OD is a “process that applies a broad range of behavioral science knowledge and practices to help organizations build their capacity to change and to achieve greater effectiveness, including increased financial performance, customer satisfaction, and organization member engagement”. OD attempts to bring about change in the different levels of the organization (the individual, group and organization) using a wide variety of interventions.

This course will introduce students to the concepts of entrepreneurship so that they have the necessary skill set to explore entrepreneurial opportunities in order to create value, generate wealth and serve society. This course is for students who want to build creative businesses in new or existing firms; foster effective, innovative work in the people they lead; and preserve their own creativity in the face of career pressures and organizational constraints. This course is designed to help you develop your own creativity, apply creative ideas in entrepreneurial ventures, and support the creativity of the people you lead. You will learn to recognize, analyze, and support creative behavior in organizations in a wide variety of industries. In this course, theoretical models and the process of OD will be discussed. Students will also learn how to improve individual, group/team and organizational performance through the use of OD techniques or interventions like group dynamics, training, culture change, and work-life balance.

### **Recommended Texts:**

- Cummings, T. G. & Worley, C. G. (2009). Organization development and change (9th edition). Canada: South-Western Cengage Learning.
- De Guia, F. (2000). Culture change: key to organization development: A success story. Makati City: Florence de Guia & Associates
- Brown, D. R. (2011). An experiential approach to organizational development. (8th ed). New Jersey: Pearson Education, Inc.

**Course Title:                      Marketing Management in Engineering Concerns**

**Course Code:                      EMG - 612**

**Credit Hours:                      Three (3)**

Combines intermediate and advanced statistical methods with practical research applications and computer software. Develops commonly used statistical models such as Two and Three-Way Analysis of Variance as well as Multiple Linear Regression for the solution of common business and industrial research problems. The statistical models are implemented and interpreted in the context of actual data sets using available statistical software (MVPStats, SPSS, and special purpose software).

At the conclusion of this course, the student should possess the ability to perform required statistical analyses for virtually any uni-variate application in a business / industrial setting. Able to describe and implement management information systems, ERP and manufacturing execution systems.

**Course Title:                      Advanced Statistical Methods for Engineering Research**

**Course Code:                      EMG 613**

**Credit Hours:                      Three (3)**

This course combines intermediate and advanced statistical methods (specifically ANOVA) with practical research applications and computer software. It also explains and gives practical experience in the use commonly used statistical experimental design models including Two and Three-Way Analysis of Variance as well as Linear Regression (time permitting) for the solution of common business and industrial research problems. The statistical models are implemented and interpreted in the context of actual data sets using statistical software programs. Mandatory Prerequisites are: EMEN 5005 and EMEN 5900; OR APPM 4570/5570 and APPM 4580/5580, or the equivalent as assessed and approved solely by the instructor. The Design & Analysis of Factorial Experiments for 2 Factors - Model I, Model II, and Model III Applications; Fully Crossed and Nested Analyses - Common Transformations. The Design and Analysis of Factorial Experiments with 3 or More Factors - Model I, Model II, and Model III Applications; Fully Crossed and Nested Analyses - AET Determination - Quasi- and Pseudo-F Ratios Review of Simple regression and correlation. Additional Measures of Relationship - Special-Purpose Indices and Methods for Correlation and Association. Non-Linear Regression Analysis, Introduction to Multiple Regression Analysis.

### **Recommended Texts**

- Statistical Principles of Experimental Design, 2nd Edition, by B. J. (Ben) Winer, McGraw-Hill, 1971.
- Design of Experiments in Quality Engineering, by Jeffrey Luftig & Victoria Jordan, McGraw-Hill Publishing Company, 1998.

**Course Title:**

**Strategic Management**

**Course Code:**

**MGT 662**

**Credit Hours Theory:**

**Three (3)**

### **Overview**

This course is designed to help the students integrate and apply their earlier functional courses and on-the-job experiences. The course takes the general management point of view, emphasizing the creation, implementation and evaluation of strategy in organizations. In addition to focusing on for-profit businesses, this section includes a module on strategy in non-profits as well. You will put yourselves in the shoes of top management and make the really important "Big Picture" decisions. You will develop expertise in the analysis of complex business situations and in clearly presenting your findings both orally and in writing. You will also further develop your ability to work effectively in teams.

### **Recommended Texts**

- Strategic Management: creating competitive advantages, Seventh Edition. Dess, Lumpkin, Eisner and McNamara, McGraw-Hill Irwin, 2013.

**Course Title: Innovation and Technology Management**

**Course Code: EMG - 614**

**Credit Hours: Three (3)**

The conceptual; framework of this course is an evolutionary process perspective on technology management and innovation. The focus is on processes to help firms better manage technology and innovation. The fundamental ideas underlying this evolutionary perspective are 1) a firm's technology strategy emerges from its technological competencies and capabilities; 2) technology strategies shaped by external (environmental) and internal (organizational) forces; and 3) the enactment of technology strategy, through the experience it generates, serves to further develop the firm's technological competences and capabilities. We will deal with typical issues that managers in technology based firms deal with. The course takes an

innovative and creative view of information technology that extends beyond the province of business applications built and used by a single organization. You will learn how organizations can commercialize their technological innovations and how the associated risks and benefits might be managed. Through the open innovation paradigm you will see how internal and external ideas can be brought together and innovations can be transferred inward and outward through licensing, joint ventures and spin-offs.

### **Recommended Texts**

- Schilling (2012). Strategic Management of Technological Innovation (4e). McGraw-Hill, New York, NY, USA.
- Chesbrough (2003) Open Innovation (1e). Harvard Business School Press, Boston, MA, USA.
- Osterwalder & Pigneur (2010) Business Model Generation (1e). Wiley Hoboken, NJ, USA.

**Course Title:** Financial Risk Management

**Course Code:** FIN - 681

**Credit Hours Theory:** 3

This course will focus on variety of risks faced by financial managers and the tools available for managing these risks. Particularly, we shall focus on credit risk, interest rate and liquidity risks, market risk, foreign exchange risk, and country risk. We shall learn about the tools and techniques available for managing these risks such as future contracts, option contracts, swaps, value-at-risk (VaR) and other standard risk-hedging techniques, and methods of measuring volatility. Students attending this course are expected to have studied basic courses of investment and portfolio management and have good understanding of asset pricing models.

### **Recommended Text Books:**

- Hull, John C., 2007, Risk Management and Financial Institutions (RMFI), Prentice-Hall.
- Hull, John C., 2006, Options, Futures, and Other Derivatives [OFOD], Prentice-Hall (sixth edition).
- Ross, Stephen A., Wester field, Randolph W., Jaffe, Jeffery F., & Roberts, Gordon S., Corporate Finance, Any Edition, McGraw Hill Ryerson, 1999. [Referred to below as "RWJR"]
- Risk Management and Derivative by Rene Stulz, second edition.

**Course Outline:** Engineering Laws and Contract Management

**Course Code:** SCM - 512

**Credit Hours:** Three (3)

Many of us unwittingly enter into contracts every day of our lives – when we leave our car in a car park, when we take a train or bus journey or when we shop. Entering into a business contract is altogether more complex and the implications of getting it wrong can have far reaching effects on the profitability of your business. Understand the origin and legal reasoning behind many of the contract clauses and terminology you use and understand why terms are couched in the way they are. Be better prepared to write and negotiate contract arrangements that provide sufficient protection to your company. Understand some of the core doctrines within English contract law such as the sanctity of contract, the privity of contract, the concept of reasonableness and how these have adapted over recent years. Identify the critical elements required to create a legally binding contract enforceable by law.

**Course Title:** Human Resource Management and Corporate Social Responsibility

**Course Code: EMG 615**  
**Credits: (03)**

Explore human resource management (HRM) in an international setting, on a course designed in response to the increasing internationalization and workforce diversity of organizations. The course focuses on managing human resources in organizations that operate across national borders and the cross cultural issues of people management. It is for those wishing to develop careers in HRM at a strategic and international level within organizations operating in the international environment.

The course enables you to develop a critical understanding of the philosophies and general practices of international HRM appreciate and critically evaluate the latest theoretical concepts, principles, standards and frameworks of HRM practice develop skills in solving complex scenarios related to improving the activities and functions of modern HRM develop a holistic approach to examining issues and solving complex International HR problems. You develop your professional expertise and improve your employability and career prospects by gaining broader international business, management and leadership knowledge. We begin by introducing you to organization theory, which covers organizational design, organizational theory and methodologies for understanding complex organizations. You also develop your critical thinking on issues such as organizational change and innovation.

**Recommended Text Books:**

- All the electronic resources i.e. slides, handouts and books are made available on the group site
- The assignments have to be submitted in hard copy on or before the date announced

**Course Title: Systems Thinking**  
**Course Code: EMG - 616**  
**Credit Hours Theory: Three (3)**

Understand that issues facing the world are complex and multi-dimensional, straddle many different factors and involve diverse multi-stakeholder systems. Understand the context in which the problems arise (culture, political systems, and values) and how disciplines or areas of interest fit into the whole. Understand how different disciplines are interconnected and interdependent. Obtain skills to address the underlying root causes rather than the symptoms of a problem. Identify positive and negative feedback across components of a system. Obtain skills to address problems that appear to be intractable. Understand how the changing nature of the world impacts upon the way in which people and organizations make decisions.

**Course Title: Advanced Big Data Analytics**  
**Course Code: SEN - 762**  
**Credit Hours Theory: Three (3)**

This course shall provide the fundamental knowledge to equip students being able to handle those challenges. This discipline inherently involves many fields. Because of its importance and broad impact, new software and hardware tools and algorithms are quickly emerging. A data scientist needs to keep up with these ever changing trends to be able to create a state-of-the-art solution for real-world challenges.

This Big Data Analytics course shall first introduce the overview applications, market trend, and the things to learn. Then, students shall be introduced fundamental platforms, such as Hadoop, Spark, and other tools, such as IBM System G for Linked Big Data. Afterwards, the course will introduce several data storage methods and how to upload, distribute, and process them. This shall include HDFS, HBase, KV stores, document database, and graph database.

The course will go on to introduce different ways of handling analytics algorithms on different platforms. Then, students shall introduce visualization issues and mobile issues on Big Data Analytics. Students will then have fundamental knowledge on Big Data Analytics to handle various real-world challenges.

Afterwards, the course will zoom in to discuss large-scale machine learning methods that are foundations for artificial intelligence and cognitive networks. The course will discuss several methods to optimize the analytics based on different hardware platforms, such as Intel & Power chips, GPU, FPGA, etc. The lectures will conclude with introduction of the future challenges of Big Data, especially on the ongoing Linked Big Data issues which involves graphs, graphical models, spatio-temporal analysis, cognitive analytics, etc.

Given large amount of data, one fundamental scientific challenge is how to develop efficient and effective computational tools to analyze the data, revealing insight and make predictions. Data analytics is the science of achieving these goals. It is an inter disciplines of machine learning, data mining, statistics, and so on. This class aims to provide an overview of advanced machine learning, data mining and statistical techniques that arise in data analytic applications. In this class, you will learn and practice advanced data analytic techniques, including: parallel algorithms, online algorithm, locality sensitive hashing, topic modelling, structure learning, and time-series analysis.

### **Recommended Texts**

- C. Bishop, Pattern Recognition and Machine Learning, Springer 2007.
- All of statistics: a concise course in statistical inference. Larry Wasserman. Springer, 2004
- Trevor Hastie, Robert Tibshirani, Jerome. H. Friedman. The elements of statistical learning: data mining, inference and prediction. Springer, 2009

<b>Course Title:</b>	<b>Information Systems Management</b>
<b>Course Code:</b>	<b>EMG - 617</b>
<b>Credit Hours Theory:</b>	<b>Three (3)</b>

This course introduces the student to the area of computer-based information system. In this course you will study system types its components, SDLC and different models of SDLC. You will also study design methods, security, virus and threats to information system. In addition to these topics you will also learn risk management and E-commerce.

### **Recommended Texts**

- Management Information Systems, Kenneth C. Laudon and Jane P. Laudon. 8th Edition, Prentice Hall

<b>Course Title:</b>	<b>Enterprise System and Audit</b>
<b>Course Code:</b>	<b>EMG - 618</b>
<b>Credit Hours Theory:</b>	<b>Three (3)</b>

This course focuses on the theory and practice of implementing and utilizing enterprise-wide application systems in organizations and their audit. Few organizations attempt to build information systems on their own and many rely upon the marketplace to fulfil their information systems needs nowadays. Furthermore, the adoption of enterprise systems is usually done in the context of a larger organizational improvement and change initiative.

Enterprise systems are usually based on packaged software products, they drive for cross-functional integration and require organization-wide resources for their implementation. The

lifecycle of enterprise systems including the development, the implementation, its use evaluation and audit involves company external entities (e.g. software vendors or consulting companies) as well as company internal entities (e.g. IT departments or end-users).

### **Recommended Texts**

- Sawyer, S. (2001). A market-based perspective on information systems development. *Communications of the ACM*, 44(11), 97-102.
- Scott, J.E., Kaindl, L. (2000). Enhancing functionality in an enterprise software package. *Information & Management*, 37, 111-122.
- Design of Enterprise Systems: Theory, Architecture, and Methods, By Ronald E. Giachetti

**Course Title:** Information system strategy and Innovation  
**Course Code:** EMG - 619  
**Credit Hours Theory:** Three (3)

To examine the way information technology is being used to influence the competitive strategy of corporations and to assess the impact of strategic deployment of information systems. Students learn to effectively manage a firm's information and technology assets in order to meet the information needs of the organization. Topics include information systems strategies; the development of information system assets; organizational information infrastructure; databases and data management including decision making support; enterprise resource planning systems; e-business; social media use by organizations; information security and risk management; innovating with information technology; and leadership and management of information systems

Students learn to effectively manage a firm's information and technology assets in order to meet the information needs of the organization. Topics include information systems strategies; the development of information system assets; organizational information infrastructure; databases and data management including decision making support; enterprise resource planning systems; e-business; social media use by organizations; information security and risk management; innovating with information technology; and leadership and management of information system

Recommended Text: Rainer, Cegielski, Splettstoesser-Hogeterp, Sanchez-Rodriguez. *Introduction to Information Systems*. 2nd Canadian Edition, Wiley, 2011

**Course Title:** Information System Security and Ethics  
**Course Code:** EMG - 620  
**Credit Hours:** Three (3)

This course provides a one-semester overview of information security. The technical content of the course gives a broad overview of essential concepts and methods for providing and evaluating security in information processing systems (operating systems and applications, networks, protocols, and so on).

In addition to its technical content, the course touches on the importance of management and administration, the place information security holds in overall business risk, social issues ethical perspective, such as individual privacy, and the role of public policy. This course will explore methods, tools, and techniques that intruders use to exploit vulnerabilities in systems. The course provides basic ethical elements of information and computer security with its risk assessment. Additionally awareness training, countermeasures and safeguards and continuity of operations are taught.

### **Recommended Texts**

- M. Whitman and H. Mattord. Principles of Information Security, 2nd Edition (CourseTechnology, 2005).
- Motiwalla, L. F., and J. Thompson, Enterprise Systems for Management, Pearson Prentice Hall, 2009.
- Peter Gregory, 2010, CISSP Guide to Security Essentials, 1st Edition.

**Course Title:       Advanced Usability Engineering**

**Course Code:       SEN - 756**

**Credit Hours Theory:   Three (3)**

This course will explore primary issues relating to usability, why they are necessary, their application, and their influence on design. Students will investigate various methods of conducting usability studies for original designs through testing scenarios and heuristic analysis. This course will give students a firm understanding of the user-centered methods and principles for the development of various kinds of interactive system, and to provide students with experience of analyzing, designing and evaluating graphical user interfaces.

### **Recommended Texts**

- Usability Engineering, Jakob Nielsen, Academic Press, 1993
- Usability Engineering: Process, Products, and Examples, Leventhal and Bames, Pearson and Prentice Hall, 2007

**Course Title:                               Socio-Technical Systems**

**Course Code:                               EMG - 621**

**Credit Hours Theory:               Three (3)**

We live and work in complex adaptive and evolving socio-technical systems. These systems may be complex for a variety of reasons. For example, they may be complex because there is a need to coordinate many groups, because humans are interacting with technology, because there are non routine or very knowledge intensive tasks, and so on. At the heart of this complexity is a set of adaptive agents who are connected or linked to other agents forming a network and who are constrained or enabled by the world they inhabit. Computational modelling can be used to help analyze, reason about, predict the behaviour of, and possibly control such complex systems of "networked" agents.

This course is based on the simulation of complex socio-technical systems. This course teaches the student how to design, analyze, and evaluate such computational models. It will introduce several styles of simulation including agent based and system dynamics. Examples of applications of these tools to various problems such as epidemiology, organizational adaptation, information diffusion, impact of new technology on groups, and so on, will be discussed. The course should be appropriate for graduate students in all areas. This course does not teach programming. Issues covered include: common computational approaches such as multi-agent systems, general simulation and system dynamics, heuristic based optimization procedures including simulated annealing and genetic algorithms, representation schemes for complex systems (particularly, groups, organizations, tasks, networks and technology), analysis techniques such as virtual experiments and response surface mapping, docking (model-to-model analysis), validation and verification, and social Turing tests. Illustrative models will be drawn from recent publications in a wide variety of areas including distributed artificial intelligence, knowledge management, dynamic network analysis, computational organization theory, computational sociology, computational epidemiology, and computational economics



### **Recommended Texts**

- Law & Kelton, Simulation Modeling & Analysis, McGraw Hill
- Carley, K. & M. Prietula (Eds) Computational Organization Theory. Lawrence Erlbaum Associates.
- Epstein, J. & R. Axtell, 1997, Growing Artificial Societies, Boston, MA: MIT Press
- Sterman, J., 2000, Business Dynamics: Systems thinking and modeling for a complex world. Irwin/McGraw-Hill.

**Course:** **Decision Support Systems**

**Code:** **CSC 518**

**Credits:** **03**

A review of the literature in the area of decision support systems (DSS) and DSS frameworks. Understanding the process of decision-making and issues involved in the design, implementation and evaluation of DSS. Additional topics include data mining, user interfaces, knowledge-based DSS, and research directions in DSS. Knowledge gained will be applied through the design and implementation of a DSS prototype.

### **Recommended Texts**

- Hand Book On Decision Support Systems, F. Burstein, Springer, 2008
- Decision Support Systems and Intelligent Systems, Ephraim Turban and Jay Aronson, Prentice-Hall, 2001.
- Making Hard Decisions Second Edition, Robert Clemen, Duxbury, 1996

**Course Title:** **Advanced Requirement Engineering**

**Course Code:** **SEN - 658**

**Credit Hours:** **Three (3)**

Systems engineering is an interdisciplinary field of engineering focusing on how complex engineering projects should be designed and managed over their life cycles. Course is about importance of System engineering. Systems engineering is a well-developed body of knowledge, techniques, and methodologies in general use throughout technically complex industries. Its goal is the efficient production of high-quality products that meet the requirements of customers. All aspects of the process--from initial definition of mission requirements to test, verification, and fabrication of the product--must be carefully planned and executed.

**Course Title:** **Advanced software and system architecture**

**Course Code:** **SEN - 621**

**Credit Hours:** **Three (3)**

Systems engineering is an interdisciplinary field of engineering focusing on how complex engineering projects should be designed and managed over their life cycles. Course is about importance of System engineering. Systems engineering is a well-developed body of knowledge, techniques, and methodologies in general use throughout technically complex industries. Its goal is the efficient production of high-quality products that meet the requirements of customers. All aspects of the process--from initial definition of mission requirements to test, verification, and fabrication of the product--must be carefully planned and executed.

### **Recommended Text:**

- Systems Engineering Principles and Practice Hardcover – May 24, 2011 by Alexander Kossiakoff

**Course name:** **Advanced Software Project Management**  
**Course Code:** **SEN-647**  
**Credit:** **(03)**

This course deals with managing information technology and software development projects. It is not restricted to project managers, but encompasses the art and science of using teamwork to meet project goals. The team includes the project manager, lead developers, software engineers, supporting functions, business experts and other stakeholders. Therefore, this course is directed to students across a wide range of backgrounds and interests. The student will learn how to conceptualize, initiate, plan and execute a successful project. Students will participate in a competitive team effort to propose a major design project. Students will be able to:

- recognize the principles of general management theory which transfer to project management
- apply techniques for successfully managing a project throughout its life-cycle
- interpret the processes and knowledge areas in the Project Management Institute's Project Management Body of Knowledge
- formulate the determination of success as a measurable organizational value
- consider the human side of projects including participation in a team project
- understand the propositions of software design by the legendary Fred Brooks

### **Textbooks**

- Information Technology Project Management 4th edition by Jack Marchewka. John Wiley & Sons (2012). ISBN 978-1-118-05763-6. This is a current textbook which is cross-disciplinary and addresses real issues and practices
- The Design of Design: Essays from a Computer Scientist by Frederick Brooks, Jr. , Pearson Education (2010). ISBN 978-0-201-36298-5. This is a readable gem about the essence and practice of software design from the author of The Mythical Man-Month.
- Required online sources or their URLs will be posted as needed.

**Revised Curriculum of Pakistan Studies and Islamic Studies**

**The Case**

1. A letter from the Registrar office directed the Department to incorporate necessary amendments in the curriculum of Pakistan and Islamic Studies in order to develop a strategy of religious tolerance. Keeping view the directions, proposed amendments have been done.
2. The proposed amendments are placed at annexure.
3. To enrich the students with patriotism, religious tolerance, humanity, brotherhood and human rights described by Islam, it is necessary to incorporate the new topics in Pakistan Studies and Islamic Studies courses.
4. Submitted for approval.
5. Amendments may please be recommended.
6. Financial: Within limits allocated for purchase of books, journals and other content.

**Annexure**

**Islamic Studies Spring 2016  
Course outline**

Wk no.	Topics	Quiz	Assignment
1	Islam/ Belief		
2	Jihad		Inform Students about Assignment 1 for next week Topic: (Firmly Hold The Rope Of ALLAH swt together and do not be divided.)
3	Revelation and Compilation of the Holy Quran		Receive Assignment 1: Topic: (Firmly Hold The Rope Of ALLAH swt together and do not be divided.)
4	Sources of Sharia law i. Quran ii. Hadith iii. Consensus (Ijma) iv. Analogy (Qiyas)	Inform about Quiz 1	
5	Human Rights i. Rights of Non-Muslims ii. Rights of Women iii. Rights of Parents iv. Rights of Neighbor	Take Quiz 1	
6	Authenticity of Ahdiths		Inform Students about Assignment : 2 (Why are we defeated Ummah today)
7	Last Sermon of PBUH Constitution Of Medina (Misaaq-E-Medina)/ Un Charter		Receive Assignment: 2 (Why are we defeated Ummah today)
8 / 9	Social Melodies/Surah Hujrat / Last Rakuh of Surah Al-Furqan		

<b>Mid Term</b>			
10	Halal food/Muslim and Non-muslim way of slaughtering	Inform about Quiz 2	Inform Students about Assignment: 3 Islamic Banking i. Muzarabah ii. Musharak iii. Ijarah iv. Mortgage v. Lawful Earning vi. Takaful
11	Islamic economic system / Capitalism / Riba	Take Quiz 2	
12 / 13	Islamic Law	Inform about Quiz 3	Take Assignment Islamic Banking i. Muzarabah ii. Musharak iii. Ijarah iv. Mortgage v. Lawful Earning vi. Takaful  Inform Students about Assignment Muslim Scientist
14	Quran and Sciences <a href="http://www.harunyahya.com/">http://www.harunyahya.com/</a>	Take Quiz 3	Take Assignment Muslim Scientist
15 / 16	Presentations / Revisions		
<b>Final Term</b>			

### **Pakistan Studies**

#### **Bahria University Islamabad Campus ( Department of Humanities & Social Sciences)**

<b>Course Code/number</b>	PK 101 - PK 112		
<b>Course Title/Name</b>	<b>PAKISTAN STUDIES</b>		
<b>Credit Hours/Contact hours</b>	2		
<b>Degree Program</b>	BSS 1 (A&B) - LLB1 A BSCS( A&B)		
<b>Prerequisites or Co-requisites</b>			
<b>Assessment Methods and Weightage</b>	Quizzes	15	
		10	
	Assignments	20	
		20	
	Mid Term	25	
		20	
	Final Examination	40	
		50	
	<b>Total</b>	<b>100</b>	
		<b>100</b>	

<b>Textbook (or Laboratory Manual for Laboratory Courses)</b>	▪ Reader				
<b>Reference Material</b>	Hand outs , Slides				
<b>Web Resources</b>					
<b>Instructor Name/Cluster Head/Subject Expert</b>	Instructor Name: SAMIA MAJEED Lecturer: Status <input type="checkbox"/> Regular Cluster Head Name: SAMIA MAJEED Subject Expert Name: SAMIA MAJEED				
<b>Course Aims</b>	The course aims at a dispassionate and objective analysis of the various dimensions of Pakistan. It is designed to enable a balanced perception of the ideological rationale and the political factors & forces that generated events leading to the creation of Pakistan. Equally important is the knowing of social structure and ethnic divide, the plural character of Pakistan's society. The main strands of Pakistan's foreign policy are to be examined in the context of historical constraints, Geo-strategic location and stresses of contemporary world. Pakistan studies , therefore, should act as a window to future .Globalization has made the world a global village and our youth actively interacts with the people belonging to different culture, races, ideologies and religions. There is a strong need to make our youth aware about the economic challenges facing by Pakistan after 9/11 attacks and Pakistan's strategic role in the world scenario.				
<b>Course Objectives</b>	This course is intended to create awareness the students with :  1. The Ideology of Pakistan, why Pakistan was created, and how did it go through the process of independence . 2. Constitutional development in Pakistan 3. Languages and ethnic groups in Pakistan 4. Relations with India and wars 5. Economy of Pakistan 6. Role of Women in Independence Movement of Pakistan 7. Role of Minorities in Independence Movement of Pakistan 8. Rights of Minorities under 1973 Constitution				
<b>Course Outcomes</b>	After completing this course ,the students will be able to : 1. Transmute themselves into more useful Pakistanis. 2. Have complete faith in Pakistan and better understanding of its ideology. The Two – Nation Theory 3. Better understanding of the core social, cultural, and ethnic problems of Pakistan. 4. Work for the solidarity of Pakistan.				
<b>Course Description/ Catalogue</b>	PAKISTAN STUDIES				
<b>Lecture Plan (16 Weeks)</b>	<b>Week # and Date</b>	<b>Lecture/ Contact Hour #</b>	<b>Topic to be covered</b>	<b>Activities</b>	<b>Class Discussion</b>
	Week 1	2	<ul style="list-style-type: none"> <li>• Orientation</li> <li>• Introduction of Ideology, Nation, Nationalism</li> </ul>		

	Week 2	2	<ul style="list-style-type: none"> <li>• Ideology of Pakistan</li> <li>• Two – Nation Theory</li> <li>• Quaid – i – Azam , Allama Iqbal</li> </ul>		
	Week 3	2	<ul style="list-style-type: none"> <li>• Muslim Predicament and Sir Syed Ahmad Khan</li> </ul>		
	Week 4	2	<ul style="list-style-type: none"> <li>• Quaid -i- Azam's Politics</li> </ul>		
	Week 5	2	<ul style="list-style-type: none"> <li>• Role of Women in Independence Movement of Pakistan</li> <li>• Role of Minorities in Independence Movement of Pakistan</li> </ul>		
	Week 6	2	<ul style="list-style-type: none"> <li>• Geo- Political importance of Pakistan</li> <li>• The surroundings and neighbours of Pakistan</li> <li>• 9/11 attacks and the U.S intervention in Afghanistan</li> </ul>		
	Week 7	2	<ul style="list-style-type: none"> <li>• Intro of Constitution</li> <li>• Constitution of 1973</li> </ul>		
	Week 8	2	<ul style="list-style-type: none"> <li>• Amendments in constitution 1973</li> <li>• Article 2, rights of minorities</li> </ul>		
	<b>Mid-Semester Exam</b>				
	Week 10	2	<ul style="list-style-type: none"> <li>• Ethnicity and Languages of Pakistan</li> <li>• Social Structure of Pakistan</li> </ul>		
	Week 11	2	<ul style="list-style-type: none"> <li>• Indo – Pakistan Relations</li> </ul>		
	Week 12	2	<ul style="list-style-type: none"> <li>• Indo – Pak War 1971</li> </ul>		
	Week 13	2	<ul style="list-style-type: none"> <li>• Pakistan Foreign Policy</li> </ul>		
	Week 14	2	Economic System of Pakistan	.	
	Week 15	2	Contemporary Economic Challenges of Pakistan	.	
	Week 16	2	Completion of Syllabus Revision		
	Week 17	2	<ul style="list-style-type: none"> <li>• Final Exams</li> </ul>		

## Approval of BCE Curriculum

### The Case

1. BCE program at Karachi campus was re-started in Fall 2013. BUIC has been offering the same program uninterruptedly for several years. Being part of the same university, the same roadmap (as mentioned in our prospectus) of BCE program was adopted for Karachi campus.
2. The interim PEC visit report of BCE program requires us to get “Approval of curriculum from the statutory body of the university” (implicitly for Karachi campus). Though they were shown ACM minutes highlighting approval of the changes we made from time to time and told that all changes are applicable at the university level offering the same program. Therefore it is requested to approve the existing BCE roadmap for Karachi Campus specifically.
3. The proposal is endorsed by DBoS and FBoS

### Annexure

### Bachelors in Computer Engineering – Roadmap

SEMESTER 1					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
CSC-110	Computing Fundamentals	None	2	1	3
EEN-110	Linear Circuit Analysis	None	3	1	4
GSC-110	Applied Calculus & Analytical Geometry	None	3	0	3
GSC-113	Applied Physics	None	3	1	4
ENG-103	English-I	None	2	0	2
ISL-101 HSS-116	Islamic Studies (For Muslims) Ethics (For Non Muslims)	None	2	0	2
Total			15+3		

SEMESTER 2					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
CEN-120	Digital Logic Design	None	3	1	4
CSC-113	Computer Programming	None	3	1	4
GSC-121	Linear Algebra	None	3	0	3
EEN-210	Basic Electronics	EEN-110	3	1	4

HSS-120	Communication Skills	None	3	0	3
PAK-101	Pakistan Studies	None	2	0	2
Total			17+3		

SEMESTER 3					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
CSC-210	Object Oriented Programming	CSC-113	3	1	4
GSC-210	Differential Equations	GSC-110	3	0	3
CEN-210	Computer Applications in Engineering Design	None	2	1	3
EEN-211	Electrical Network Analysis	EEN-110	3	1	4
CEN-221	Computer Architecture & Organization	CEN-120	3	1	4
Total			14+4		

SEMESTER 4					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
CSC-320	Operating Systems	CEN-211	3	1	4
	CE Depth Elective I		3	1	4
CSC-221	Data Structures & Algorithms	CSC-210	3	1	4
GSC-220	Complex Variables & Transforms	GSC-110	3	0	3
CSC-220	Database Management Systems	CSC-210	3	1	4
Total			15+4		

SEMESTER 5					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
GSC-320	Numerical Analysis	GSC-121/ GSC-210	3	0	3
EEN-313	Signal & Systems	GSC-210/ GSC-220	3	1	4
	CE Depth Elective II		3	1	4
	CE Depth Elective III		3	1	4
GSC-221	Discrete Mathematics	None	3	0	3
Total			15+3		



SEMESTER 6					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
GSC-122	Probability & Statistics	None	3	0	3
CEN-222	Data Communication & Networks	None	3	1	4
CEN-321	Microprocessor & Interfacing	CEN-221	3	1	4
HSS-320	Technical Writing & Presentation Skills	None	3	0	3
	CE Depth Elective IV		3	1	4
Total			15+3		

SEMESTER 7					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
ESC-498	Project-I	None	0	3	3
HSS-411	Engineering Economics & Management	None	3	0	3
	IDEE-I		3	0	3
	CE Depth Elective V		3	1	4
Total			9+4		

SEMESTER 8					
Course Code	Course Title	Prerequisite	Credit Hours		
			Lec.	Lab.	Total
ESC-499	Project-II		0	3	3
HSS-421	Entrepreneurship & Leadership	None	3	0	3
	IDEE-I		3	1	4
HSS-422	Engineering Ethics	None	3	0	3
Total			9+4		

**Total Credit Hours: 137**

## **Revised Roadmap and Curriculum for MSEE Program**

### **The Case**

1. Bahria University is offering MSEE program since fall 2012 in four different specializations.
2. With passage of time, it has been pertinent to revise and update the MSEE roadmap and curriculum in order to synchronize with the current and future trends.
3. Keeping in view, HoDs at both campuses revised the roadmap in consultation with their Faculty.
4. The proposed roadmap is approved by FBoS and tabled for the approval of ACM.

### **Recommendation**

5. The revised roadmap of MS-EE may please be approved.

### **Annexure**

## **MS Electrical Engineering (MSEE) program**

### **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.

### **Objectives**

The objective of Master of Science in Electrical Engineering program is to enhance the student's ability to get successful advancement in their chosen fields either industry, academia or public institution. Further, to make significant contribution to the field of Electrical Engineering, MSEE degree provides intensive preparation for professional practice in a broad spectrum of high-technology areas of Electrical Engineering.

### **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.

### **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.

## **MSEE Specializations:**

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

- Communication Systems and Networks
- Automation and Control
- Power Systems
- Embedded Systems

### **Communication Systems and Networks**

The MS in Communication Systems and Networks 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 thesis/projects cover a range of applications in areas of:

- Advanced Optical and Wireless Networks
- Future Generation Communication Technologies
- Cognitive Cooperative Networks
- Digital Signal and Image Processing
- Vehicular Networks and Intelligent Transportation Systems

### **Embedded Systems:**

Embedded systems are a key technology of modern society. Whether in the self-propelled industry, aerospace, medicinal technology or in telecoms, media and sport industries. Embedded systems always behave a major role in hi-tech technology.

The MS in Embedded Systems provides a solid theoretical and practical hands on experience to design

Microelectronic and mechanic devices using software-based components to respond real-time to process inputs to ensure proper operation. With the techniques used in modern digital system design using FPGAs as hardware platform and VHDL as digital design language. The program combines relevant theory, state-of-the-art tools and methodologies used in industry and academia. Special emphasis is placed on engineering skills, integration of software and hardware, system design, safety, reliability and optimization of the design process.

Focused research areas are...

- Hardware Software Co-design approach
- Real time Operating Systems
- Systems on chips
- Software Defined Radio
- High level language Approach

### **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

### 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
- Smartgrids

### 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.

**Thesis Option (MS by Research):** The requirement is minimum 24 credit hours of course work and 6 credit hours of thesis involving research work.

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

### Semester Roadmap for MSEE (MS by Research)

#### Semester – I

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

#### Semester – II

i.		Core – III
ii.		Core- IV
iii.		Research Methodology

#### Semester – III

i.		Elective-II
ii.	ESC 500	Thesis-I / Elective IV

#### Semester – IV

i.		Elective-III
ii.	ESC 500	Thesis-II / Elective V

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

\*\* Thesis contains 6 credit hours.

### Semester Roadmap for MSEE (Course work)

Semester – I	Semester – II
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i.	EEN 501	Stochastic Processes (Core-I)	i.		Core-III
ii.		Core – II	ii.		Core – IV
iii.		Elective – I	iii.		Elective – II (Univ Requirement*)
<b>Semester – III</b>			<b>Semester – IV</b>		
i.		Elective-III	i.		Elective-V
ii.		Elective-IV	ii.		Elective-VI

## 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.

### Communication Systems and Networks

#### Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	EEN 510	Stochastic Processes	3
2.	EET 555	Wireless and Mobile Communications	3
3.	EEN 712	Advanced Digital Communications Systems	3
4.	EET 762	Communication Networks Arch & Protocols	3

#### 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 725	Advanced Routing and Switching	3
11.	EET 726	Advanced Internet Technologies	3
12.	EET 723	Optimization Techniques	
13.	EET 850	Wireless Sensor Networks	3
14.	EET 713	Advanced Network Design	3
15.	EET 757	Mobile Computing	3
16.	EET 552	Multimedia Networking	3
17.	EET 702	Advanced Network Security	3
18.	CEN 745	Advanced Digital Image Processing	3
19.	ESC 716	Advanced Topics in Wireless & Networking	3
20.	ESC 501	Research Methodology (Univ Requirement)	3
21.	EET 553	Information Theory and Coding	3
22.	EEN 725	Advanced Digital Signal Processing	3
23.	EET 727	Cognitive Cooperative Networks	

#### Automation and Control

#### Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	EEN 510	Stochastic Systems	3
2.	EEN 524	Electronic Design and Analysis	3
3.	EEN 726	Modern Control Theory	3
4.	EEN 725	Advanced Digital Signal Processing	3

### 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 Control Systems	3
10.	EEA 540	Mechatronics	3
11.	CEN 722	Advanced Interfacing Techniques	3
12.	EEA 741	Advanced Topic in Industrial Automation	3
13.	EEA 702	Advanced Topic in Control Systems	3
14.	CEN 745	Advanced Image Processing	3
15.	ESC-501	Research Methodology (Univ Requirement)	3
16.	EEA-703	Dynamic Modelling Systems	3
17.	EET 723	Optimization Techniques	3
18.	EEA-704	Adaptive Control Systems	3

### Power Systems

#### Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	EEN 510	Stochastic Systems	3
2.	EEP 514	Renewable Energy	3
3.	EEP 558	Power Transmission and Distribution	3
4.	EEP 559	Power Generation and Plant Operation	3

#### Elective Courses

Sr. No.	Course Code	Elective Course Title	Credit Hours
1.	EEP 716	Advanced Power System Analysis	3
2.	EEP 717	Advanced Power System Planning	3
3.	EEP 718	Advanced Power System Protection	3
4.	EEP 561	High Voltage Engineering Design	3
5.	EEP 754	Smart Grid System Operation	3
6.	EEP 521	Design of Electrical Machines	3
7.	EEP 564	Hydel Power Generation	3
8.	EEP 565	Integration of Distributed Generation	3
9.	EEP 566	Power System Reliability	3
10.	EEP 719	Advanced Topics in Power Systems Engineering	3

11.	EEP 514	Renewable Energy	3
12.	EEP 757	Non-Conventional Energy Systems	3
13.	EEP 516	Solar Power Generation	3
14.	EEP 517	Wind Power Generation	3
15.	EEP 519	Hybrid Power Systems	3
16.	EEP 714	Advanced Topics in Renewable Energy	3
17.	EEP 723	Thermal and Nuclear Power Generation	3
18.	EEP 720	Computer Methods in Power Systems	3
19.	EEP 721	Insulation Co-ordination in Power Systems	3
20.	EEP716	Advanced Power Electronics	3
21.	EEP 502	Advanced Power System Operation and Control	3
22.	EEP 501	Research Methodology (Univ. Requirement)	3

## Embedded Systems

### Core Courses

Sr. No.	Course Code	Core Course Title	Credit Hours
1.	EEN 510	Stochastic Systems	3
2.	EEN 725	Advanced Digital Signal Processing	3
3.	CEN 741	ASIC and FPGA Design	3
4.	CEN 540	Embedded Systems Design	3

### Elective Courses

Sr. No.	Course Code	Course Title	Credit Hours
1	CEN-760	Reconfigurable Computing	3
2	CEN 740	Advanced Embedded System Design	3
3	EET-731	Modeling, Simulation and Specification	3
4	CEN 745	Advanced Image Processing <a href="http://www.kth.se/student/kurser/kurs/EQ2330?l=en">http://www.kth.se/student/kurser/kurs/EQ2330?l=en</a>	3
5	CEN-501	Embedded Operating Systems	3
6	CEN-760	Advanced Algorithms & Complexity	3
7	EEP 501	Research Methodology (Univ. Requirement)	3
8	CEN 741	ASIC Design Methodology	3
9	CEN 742	Advanced Digital System Design	3
1	CEN-761	System Level Packaging	3
1	CEN 752	Advanced VLSI System Design	3
1	CEN-502	Mixed Signal IC Design	3

1	CEN-503	Computerized Tomography Systems	
1	CEN-504	Digital Data Acquisition & Control	3
1	CEN-762	Advanced Topic in Embedded Systems	3
1	CEN-763	System on Chip Architecture and Programming	3
1	CEN-764	Design of Fault-Tolerant Systems	3
1	CEN-765	Selected Topics in Digital Systems	3
1	CEN-720	Advanced Computer Architecture	3



## Addition of PhD Elective Course

### Background to the Case

1. PhD-EE students pursuing research in Control Systems have few courses available in the PhD roadmap.
2. HEC has also desired to update and increase the elective courses of PhD program.
3. The Control Systems – Research Group has proposed elective course ‘EEN-828 Advanced Nonlinear Control Systems’. The course outline as per the existing format are attached
4. The proposal is endorsed by DBoS and FBoS.

### Financial Effect

- Nil

### Recommendations:

- “EEN-828 Advanced Nonlinear Control Systems” may please be added as Elective course in PhD-EE program.
- The course outlines are attached.

### Establishment / HR / Financial Effect

- Nil

### Annexure

<b>Advanced Non-Linear control Systems</b>	
<b>Course Code:</b>	EEN-828
<b>Credit Hours:</b>	3
<b>Pre requisite:</b>	<ul style="list-style-type: none"> <li>• Linear control systems</li> <li>• Modern Control Theory</li> </ul>
<b>Objectives:</b>	<p>This course aims to introduce the analysis of nonlinear system, and the common nonlinear control schemes. The course is divided into two parts, namely analysis and synthesis. In the analysis part, the state space description of nonlinear system is introduced, and the phase portrait analysis of the second order system is elaborated. Stability analysis of the nonlinear system, based on linearization method, and direct method of Lyapunov, is explained. While the stability analysis is completed with Lasalle's theorem, absolute stability notion, Popov, and circle criteria, and the stability analysis of time varying nonlinear systems. Finally, the analysis of limit cycles is thoroughly elaborated using describing functions. In the synthesis part, after introducing of Lie Algebra, and required mathematics, Feedback linearization methods for input-state, and input-output cases are described and backstopping method and sliding mode control is introduced.</p>
<b>Course Outline:</b>	<ul style="list-style-type: none"> <li>• Dynamics and modeling of nonlinear systems</li> <li>• Feedback linearization, Lie algebra,</li> </ul>

	<ul style="list-style-type: none"> <li>• Sliding Mode Controllers</li> <li>• Vector Field Methods</li> <li>• Fuzzy State Space Models</li> <li>• Stability of non Linear Systems</li> <li>• Quadratic Indices</li> <li>• Lyapunov's Indirect Method, Lyapunov-Like Analysis</li> <li>• Optimal Control</li> <li>• Calculus of Variations</li> <li>• Euler–Lagrange Equation</li> <li>• Linear Quadratic Regulator</li> <li>• Pontryagin's Minimum Principle</li> <li>• Optimal Control with Constraints on Inputs</li> </ul>
<b>Resources:</b>	<ol style="list-style-type: none"> <li>1. Systems and Control by Stanislaw H. Zak</li> <li>2. Nonlinear Systems by Hasan Khalil.</li> </ol>

## Inclusion of Courses in PhD Roadmap

### The Case

1. MS SE roadmap is revised such that the following courses are added in the MS roadmap that can be taught at the PhD level.

1	SEN-758	Component-based Software Engineering	3
2	SEN-760	Complex Adaptive Systems	3
3	SEN-761	Semantic Web	3
4	SEN-762	Advanced Data Analytics and Business Intelligence	3
5	SEN-759	Software Re-Engineering	3

2. They may be included in PhD roadmap as well.

### Revised Curriculum LLB

1. The HEC's National Curriculum Review Committee has revised the LLB 5-year curriculum. The changes introduced by the NCRC need to be approved by the Academic Council of BU. The revised curriculum is annexed with the agenda item. Approval is also required for the implementation of revised curriculum of the LLB (5-Year) Program from Fall-2016 Semester.
2. As per Pakistan Bar Council's (Legal Education) Rules-2015, all law imparting institutions are required to follow the HEC/ PBC approved curriculum.
3. FBOS agreed to the revised proposal. However, it decided to wait for the official notification of the revised curriculum by the HEC.
4. The curriculum of LLB 5-Year Degree program revised and duly approved by Higher Education Commission, Islamabad through its NCRC-Law is recommended for approval for implementation in the Department of Law w.e.f. Fall-2016 Semester.

### Annexure

#### REVISED CURRICULUM APPROVED BY THE NCRC OF THE HEC/ PBC IN THE LLB 5-YEAR SCHEME OF STUDIES.

##### SEMESTER-1

- LLB 113:** The course '**Sociology**' to be renamed as '**Introduction to Sociology**'. The Course contents will remain the same.
- LLB 116:** The course '**Skills Development-1**' to be called only '**Skills Development**'. The course contents will remain the same.

##### SEMESTER-2

- LLB 123:** The course '**Political Science**' to be renamed as '**Principles of Political Science**'. The course contents will remain the same.
- LLB 126:** The course '**Skills Development-II**' to be dropped and replaced by '**Law of Torts-I**'.

##### SEMESTER-3

- LLB 212:** The course '**Logic and Reasoning**' is renamed as '**Introduction to Logic and Reasoning**' without affecting the course contents.
- LLB 214:** The course '**Law of Torts**' is renamed as '**Law of Torts-II**'
- LLB 216:** The course '**Research Methods**' is moved to Semester-9 and is replaced by an independent course to be called '**Constitutional Law-I (UK)**'

##### SEMESTER-4

- LLB 222:** The course '**Constitutional Law-II (Comparative)**' is to be renamed as '**Constitutional Law-II (US)**'. It will be an independent course with regard to the US Constitution only.
- LLB 225:** The course "**Comparative Religions**" is dropped and to be replaced by another course to be called '**Introduction to Psychology**'.

## SEMESTER-5

- LLB 312: The course '**Constitutional Law-II (Pakistan)**' is renamed as '**Constitutional Law-III (Pakistan)**'.
- LLB 315: The Course '**Law of Property-I**' is renamed as '**Law of Property**' only.

## SEMESTER-6

- LLB 322: The course '**Corporate Law**' is renamed as '**Law of Business Organizations**'
- LLB 325: The course '**Law of Property-II**' is renamed as '**Land Laws**'.

## SEMESTER-7

- LLB 412: The course '**Constitutional History of Pakistan**' to be renamed as '**Constitutional Developments in Pakistan**'.

## SEMESTER-9

- LLB 511: The course '**Administrative Law-I**' is replaced by '**Research Methods**' earlier placed in Semester –III.
- LLB 512: The existing independent course titled '**Legal Ethics**' is combined with the course Moot Cases and is replaced by a new course to be called '**Minor Acts**'
- LLB 515: The course '**Moot Cases and Role Playing**' is renamed as '**Moot Cases and Professional Ethics**'

## SEMESTER-10

- LLB 521: The course '**Administrative Law-II**' is renamed as '**Administrative Law**'.
- LLB 522: The course '**Interpretation of Statutes**' will now also include Legislative Drafting. Hence the course is renamed as '**Interpretation of Statutes and Legislative Drafting**'

The final draft is fully in line with the HEC standardized format/ scheme of studies for integrated curricula for Bachelor's Degree Programmes. Efforts have been made to follow the guidelines and standards of HEC and the PBC. The details of the breakup of the proposed LLB degree program is reproduced below. There is no change in the Total credit Hours.

### SCHEME OF STUDIES FOR LLB (5-YEAR) PROGRAM

RED	Compulsory Courses	10	28 Cr. Hrs
GREEN	General and Foundation	08	24 Cr Hrs
BLUE	Discipline Specific Major Courses including Research Project and Electives	38	114 Cr Hrs
TOTAL		56	166 Cr Hrs

Semester / Year	Name of Subject	Credits
FIRST		
LLB 111	ENGLISH-I	3
LLB 112	PAKISTAN STUDIES	2
LLB 113	INTRODUCTION TO SOCIOLOGY	3
LLB 114	FUNDAMENTALS OF ECONOMICS	3
LLB 115	INTRODUCTION TO LAW	3

LLB 116	SKILLS DEVELOPMENT	3
		17
SECOND		
LLB 121	ENGLISH –II	3
LLB 122	ISLAMIC STUDIES/ETHICS	2
LLB 123	PRINCIPLES OF POLITICAL SCIENCE	3
LLB 124	LEGAL SYSTEM OF PAKISTAN	3
LLB 125	HISTORY (SOUTH ASIA)	3
LLB 126	LAW OF TORTS-1	3
		17
THIRD		
LLB 211	ENGLISH-III	3
LLB 212	INTRODUCTION TO LOGIC AND REASONING	3
LLB 213	ISLAMIC JURISPRUDENCE – I	3
LLB 214	LAW OF TORTS-II	3
LLB 215	LAW OF CONTRACT – I	3
LLB 216	CONSTITUTIONAL LAW-I (UK)	3
		18
FOURTH		
LLB 221	HUMAN RIGHTS LAW	3
LLB 222	CONSTITUTIONAL LAW-II (US)	3
LLB 223	LAW OF CONTRACT-II	3
LLB 224	ISLAMIC JURISPRUDENCE – II	3
LLB 225	INTRODUCTION TO PSYCHOLOGY	3
		15
FIFTH		
LLB 311	JURISPRUDENCE – I	3
LLB 312	CONSTITUTIONAL LAW-III (PAKISTAN)	3
LLB 313	ISLAMIC PERSONAL LAW – I	3
LLB 314	CRIMINAL LAW-I	3
LLB 315	LAW OF PROPERTY	3
		15
SIXTH		
LLB 321	JURISPRUDENCE – II	3
LLB 322	LAW OF BUSINESS ORGANIZATIONS	3
LLB 323	ISLAMIC PERSONAL LAW – II	3
LLB 324	CRIMINAL LAW – II	3
LLB 325	LAND LAWS	3
		15
SEVENTH		
LLB 411	PUBLIC INTERNATIONAL LAW – I	3
LLB 412	CONSTITUTIONAL DEVELOPMENTS IN PAKISTAN	3
LLB 413	CIVIL PROCEDURE-I	3
LLB 414	CRIMINAL PROCEDURE – I	3
LLB 415	LAW OF EVIDENCE – I	3
LLB 416	LEGAL DRAFTING – I	3
		18
EIGHT		
LLB 421	PUBLIC INTERNATIONAL LAW – II	3
LLB 422	EQUITY AND SPECIFIC RELIEF	3
LLB 423	CIVIL PROCEDURE – II	3
LLB 424	CRIMINAL PROCEDURE – II	3
LLB 425	LAW OF EVIDENCE – II	3
LLB 426	LEGAL DRAFTING – II	3
		18

<b>INTERNSHIP</b>	<b>After Completion Of 8<sup>th</sup> Semester And Before 10<sup>th</sup> Semester (During Summer Vacations)</b>	<b>3</b>
<b>NINTH</b>		
<b>LLB 511</b>	<b>RESEARCH METHODS</b>	<b>3</b>
<b>LLB 512</b>	<b>MINOR ACTS</b>	<b>3</b>
<b>LLB XXX</b>	<b>ELECTIVE – I *</b>	<b>3</b>
<b>LLB XXX</b>	<b>ELECTIVE– II *</b>	<b>3</b>
<b>LLB 515</b>	<b>MOOT CASES AND PROFESSIONAL ETHICS</b>	<b>3</b>
		<b>15</b>
<b>TENTH</b>		
<b>LLB 521</b>	<b>ADMINISTRATIVE LAW</b>	<b>3</b>
<b>LLB 522</b>	<b>INTERPRETATION OF STATUTES AND LEGISLATIVE DRAFTING</b>	<b>3</b>
<b>LLB 523</b>	<b>RESEARCH PROJECT</b>	<b>3</b>
<b>LLB XXX</b>	<b>ELECTIVE - III *</b>	<b>3</b>
<b>LLB XXX</b>	<b>ELECTIVE– IV *</b>	<b>3</b>
		<b>15</b>

**Total Credit Hours = 166**

**\* ELECTIVE COURSES**

1. Alternate Dispute Resolution
  2. Banking Laws
  3. Conflict of Laws
  4. Consumer Protection Laws
  5. Custom and Tariff Laws
  6. e-Commerce Law
  7. Election Laws
  8. Environmental Laws
  9. Gender and Law
  10. Insurance laws
  11. Intellectual Property Laws
  12. International Economic Law
  13. International Humanitarian Law
  14. International Institutions
  15. International Trade Law
  16. Islamic Commercial Laws
  17. Labour Laws
  18. Law and Development
  19. Law and Energy
  20. Law and Society in Pakistan
  21. Local and Special Laws
  22. Media Laws
  23. Medical and Forensic Law
  24. Mergers and Acquisitions
  25. Islamic Legal Maxims
  26. Public Interest Litigation
  27. Securities Regulation
  28. Shipping and Admiralty Laws
  29. Taxation Laws
  30. Telecommunication Laws
- The Course-codes allotted to different courses are for the convenience of the universities; the universities may change and modify the course-codes according to their Course-Coding Scheme.
  - 10 to 12 weeks internship after the completion of 8<sup>th</sup> semester and before the start of 10<sup>th</sup> semester shall be compulsory for all students with law firms, law offices, courts, private and public companies, government offices, NGO's, police stations, legal branch of armed forces,

stock exchanges, SECP, banks, financial institutions, ports, media houses, political parties, national research institutes, industries, and with other entities to be recognized by University/ institution on the suggestion of students or faculty. Attachment/ internship period spent by each student with any entity mentioned hereinbefore shall be assessed on the basis of his/her report, self-assessment, faculty assessment and assessment provided by organizations.

- All Students after the successful completion of 9th semester must take a Research Project and write a long dissertation on assigned topics.
- In the last two semesters (IX and X) students can opt for any four courses of their choice from the list of elective courses to be offered by the University/ institution. In case a course is divided in two modules, the second module of the same course will be compulsory. For example if the course 'A' is divided into A-I and A-II, a student will be required to complete the second module A-II also.



**Fida Hussain**  
Director General (Academics)

## HIGHER EDUCATION COMMISSION

H-9, ISLAMABAD, PAKISTAN, Website: <http://www.hec.gov.pk>

No. 9-214/Adoption/Curri/HEC/2014-15/407

March 08, 2016

### Notification

In pursuance of the approval of the competent authority, Curriculum Division of Higher Education Commission is pleased to notify the following curriculum revised by the respective National Curriculum Revision Committee during the year 2014-15 for adoption and implementation by all public and private universities/DAs:

#### 1. LLB (5 YEARS)

All universities/DAs are requested to place the revised curriculum before their appropriate committee/board for adoption/implementation and the report on prescribed Proforma (attached) may kindly be forwarded to Curriculum Division HEC for necessary record.

*HoD (Law)*  
*As discussed pre.*  
*16/3/16*  
*should this go through*  
*near for journal*  
*approval.*  
The Rector,  
Bahria University (BU),  
Shangrilla Road, Naval Complex,  
E-8, Islamabad.

(Fida Hussain)

OFFICE OF THE DIRECTOR ACADEMIC AFFAIRS
Inward No. 169
Date: 15/3/16
File No. 320/16

E-mail: [fhussain@hec.gov.pk](mailto:fhussain@hec.gov.pk), Ph: +92-51-90402100, Fax: +92-51-90402102



**MS Finance (Islamic Banking and Finance) new Launch Proposal****The Case**

1. MS BUIC plans launching new programme with the given name. It was explained under the guidance of HOD, MS, BUIC. Without much discussion it was agreed to for ACM. Details of the case are at Annexure.
2. The point is recommended for approval in upcoming ACM.

**Annexure****Background**

Islamic banking and finance industry is expanding world over with an unprecedented growth. The global volume of Shari'a compliant assets has reached to US \$ 1,700 Billion by the end of 2013, displaying a growth of 21% from 2007-13 (GIBCR-2014) with presence in above 50 countries. Middle East and North Africa (MENA) region is the center of Islamic finance market and contributes 74% share in global assets under Islamic finance, followed by East Asian region with a share of 17% while 9% from rest of the world. Share of banking assets is 90% followed by equity funds 5% and balance includes others in the global volume of assets under Islamic finance. Islamic finance has shown resilience to global economic crisis in 2007-08 with a healthy growth rate, primarily due to its unique feature of asset based financing. To regulate the industry global bodies have been set up including Auditing and Accounting Organization for Islamic Financial Institutions (AAOIFI) and Islamic Financial Services Board (IFSB) etc. So far, AAOIFI has issued above 40 Shari'a standards and 25 accounting standards, 5 auditing standards, 4 corporate governance standards and 2 codes of ethics. Also IFSB has issued more than 15 standards covering various aspects of Islamic banking business including risk management.

Islamic finance has also expanded in capital markets in the form of Islamic equity funds and Sukuk. Global volume of assets under equity funds has reached to US \$ 74 Billion by the end of 2013. There are around 900 funds worldwide. According to Ernst & Young (2014) potential is US \$ 500 Billion. Saudi Arabia, Malaysia, UAE and Kuwait are centers of funds management. Equity funds account for the largest segment of the market: around 40% of funds, followed by commodities 15%, other investments including alternative investments and feeder funds 13%, fixed income 12%, money market 9% and balanced 2%. [IFSL-2013]. According to ISI Emerging Markets<sup>1</sup>, approximately 2000 issues of Sukuk were held with Global volume of around US \$200 Billion by the end of June 2010, however pace of Sukuk issuing was increased during 2011-12 and upto June 2013, volume of Sukuk issued in two and half years was US \$281 Billion [IFSL-2013]. In addition to corporate Sukuk, Sovereign Sukuk are also issued by the governments including Pakistan, Jordan, UAE, Thailand, Malaysia, Turkey, Indonesia, Bahrain, Qatar, Cayman Islands, Singapore, Germany, Brunei, Gambia and Kuwait. To address the issue of investment in marketable equities (which are primarily based on profit and loss sharing principle), Shari'a screening filters have been developed and we have above ten Islamic Indexes operating worldwide including DJIM, FTSE, Nasdaq, S&P, MSCI, HSBC, Ameri, BID, Azzad and KMI.

Pakistan has a proud distinctive position in developmental process of modern Islamic finance. First ever Riba (interest) free banking experience economy-wide was done in Pakistan, which

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<sup>1</sup> <http://www.securities.com/> accessed on 5<sup>th</sup> July, 2010.

although failed, however a lesson is being learned from this failure by Pakistan as well as other countries. In the words of Prof. Volkar “Pakistan has served as an academic power house for modern Islamic finance in 1980-90<sup>1</sup>”. Great research work has been done by Modoodi, Khurshid, Zaman, Tanzeel and Usmani, to mention few. Also at government level Pakistan has included in its constitution to eliminate Riba from the economy (Article 227). Higher Judiciary in Pakistan has also played its role in promotion of modern Islamic finance. After learning from the failure of abrupt switching from-conventional-to-Islamic finance, state bank of Pakistan adopted a different strategy for promotion/implementation of Islamic finance from 2000 onward. At present, Islamic finance is being practiced in parallel to conventional finance in Pakistan. Islamic financial services are expanding nationwide and by the end of March 2015 the number of Islamic Banking Institutions (IBIs) has reached to 22<sup>2</sup>, with a branch network of 1,597, carrying asset under management of PKR 1,302/- Billion, covering 10.4% of market share (SBP-2015). Islamic finance has shown a healthy growth of 28% per annum for 2008-13. State bank has prepared a strategic plan for nationwide expansion of Islamic finance. Meezan bank alone has planned further 100 branches in the year 2015. Also in Pakistan above 50 Islamic mutual funds and five Islamic insurance companies are being operated. This overwhelming growth and expansion in Islamic finance sector has a clear message for business schools i.e. more demand for graduates.

Islamic finance is clearly a distinct stream of financing due to certain Shari’a restrictions including prohibition of Riba (interest & usury), Gharar (excessive risk), Myser & Qimar (speculation, game of chance), Shirka (profit & loss sharing) and Halal (financing for permitted) ventures only. There are certain challenges for modern Islamic finance system including cash financing, trained human resources, Information technology applications, Islamic finance education, application of AAOFI standards, default handling mechanism, risk sharing (profit and loss operation) and not risk transferring (through application of selling modes). Also regulation and existing non conduciveness of business environment is another challenge to be dealt by Islamic finance practitioners.

### **MS (Islamic Banking & Finance)**

During latest DBOS-Meeting after due consideration, it was decided to offer Islamic Finance specialization in existing MS-Finance degree as a first step and later on to move for design of a full-fledge Islamic finance course, after looking at market response. A three Member Committee was formed to prepare courses list. Committee met twice and following are recommendations.

Keeping in view the potential of Islamic finance industry, it is proposed to Management Sciences Department at Bahria University, Islamabad to add Islamic finance specialization courses in Masters programs including MBA and MS in addition to existing specializations of finance, marketing, Human resources etc. It is reiterated that MS-Finance should be given the opportunity to specialize in Islamic finance, as due understanding of general business education (including conventional finance) is required to practice modern Islamic finance. As entry requirement for MS-Finance program is four years business education at under-graduation level, hence they are the suitable candidates for Islamic finance specialization. Although we already have approved program for MBA with Islamic finance specialization, however given the overwhelming response to call for admission in MS-Finance program, it is pertinent to consider offering of Islamic finance specialization in this program. There is a good number of institutions globally as well as in local market offering Islamic finance qualification

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<sup>1</sup> Personal communication with author

<sup>2</sup> 5 are fully fledged Islamic banks and 17 are conventional banks with independent Islamic banking divisions.

(a very brief list is provided in appendix). Following specialization courses are suggested in the area of Islamic Finance which can be increased with the passage of time. Any three to four courses from the list are recommended for MS specialization in the area of Islamic banking and finance in addition to general courses.

- Islamic Commercial Laws
- Islamic Insurance
- Islamic Banking
- Islamic Capital Market
- Islamic Accounting
- Regulation & Governance of Islamic Financial Institutions
- Seminars in Islamic Finance

### **ISLAMIC COMMERCIAL LAWS**

In this subject students will be introduced some of the core principles of Islamic financial/commercial laws and develop a working knowledge of Islamic commercial transactions. Students will examine the primary and secondary sources of Islamic Law. Course covers the principles of Shari'a sales, contracts, currency exchange, modern corporations, Ijarah, Musharaka, Mortgages etc. Students are also expected to understand and appreciate different schools of thought and their findings relating to financial matters, however AAOIFI Shari'a standards shall prevail.

### **ISLAMIC INSURANCE**

In this subject, students shall be introduced with philosophy, law and practice of Islamic insurance (takaful) vis-à-vis conventional insurance. On successful completion of this subject, students will have a sound understanding of the concept of insurance, its types, operating principles, Shari'a objections on conventional insurance, alternative models of Islamic insurance and contemporary issues. They will be able to do a Shari'a audit of takaful operations, identify issues with its business models and suggest Shari'a-complaint solutions where appropriate. Understanding of various takaful models (including wakala-mudaraba and wakala-wakala) and local laws relating to establishment and operation of takaful is also part of the course.

#### **Contents**

Risk and Insurance, Shari'a guidelines, Gharar, Myser, Riba, concept of takaful, current industry state, issues in takaful industry, takaful models, contracts of takaful, classes of takaful-general and family, takaful accounting, underwriting, retakaful and customer services, corporate governance and regulatory framework.

### **ISLAMIC BANKING**

The subject is meant for introducing operations of Islamic banking covering deposits as well as financing products being used by Islamic banking industry. It includes historic developments and portfolio management of Islamic banks including selling modes (Murabaha, Salam and Istisna'a), rental modes (Ijarah) and profit and loss sharing modes (Musharaka, Mudaraba and Diminishing Musharaka). Course also covers cash financing and risk management and regulations of Islamic finance.

#### **Course Contents**

Introduction, Riba in Revelations, Historic background, current status, Rules of Sales, Murabaha financing, Salam financing, Istisna'a financing, Musharaka, Diminishing Musharaka,

Mudaraba, Deposits, Risk management Guidelines SBP and updated regulatory framework any other emerging issue....

### **ISLAMIC CAPITAL MARKET**

This course is designed to equip the students with tools and techniques being used in modern Islamic capital market. Course consists of two parts with equal weight, each covering equity and Sukuk. It includes underlying principles of Shari'a indexes (comparative study of screening criteria) and operation of Islamic capital and money market funds. Students will be introduced to Sukuk mechanism under Islamic finance covering Shari'a legitimacy, design of Sukuk, various types and offering documents.

### **FINANCIAL REPORTING OF ISLAMIC FINANCIAL INSTITUTIONS (ISLAMIC ACCOUNTING)**

Islamic Accounting is meant for an understanding of issues in conventional accounting and alternatives are being offered. Why Islamic accounting is required? And what are financial implications by application of conventional accounting standards in preparation of annual reports of Islamic organizations. Students shall be equipped with accounting techniques necessary to prepare as well as conduct analyses of financial records/annual reports of Islamic organizations.

#### **Contents**

Objectives of financial accounting, accounting principles, General presentation, Murabaha accounting, Equity of investment accounts holder, Musharaka and diminishing Musharaka accounting, Salam and Parallel Salam, Ijarah accounting, Zakah, Istisna'a and parallel Istisna'a, provisions and reserves, Islamic insurance, investment funds, foreign currency accounting, segment reporting and consolidation, Auditing and governance of Islamic Financial Institutions.

### **REGULATIONS & GOVERNANCE OF ISLAMIC FINANCIAL INSTITUTIONS**

This course is meant to update on regulatory fronts of Islamic finance. It includes legal developments globally as well as in local market to regulate Islamic finance industry, covering banking, Takaful, capital markets etc. Also this course includes a section on corporate governance of Islamic finance institutions and covers corporate governance standards as issued by AAOIFI (Accounting and Auditing Organization for Islamic Financial Institutions).

### **SEMINARS IN ISLAMIC FINANCE**

This course is meant for inclusion of current issues and trends in the area of Islamic finance. In this subject students will be introduced some of the core principles of Islamic financial/commercial laws

#### **Committee**

**Dr. Muhammad Hanif**

**Dr. Muhammad Ali**

**Dr. Taqadas Bashir**

Appendix-Partial list of institutions-Islamic Finance Qualification

#### **MBA**

London School of Business and Finance, UK

Bangor University, UK

EUCLID with presence in New York, Washington DC, Geneva, Brussels, Berlin-Online MBA

Canadian University Dubai

Alhuda CIBE, Lahore-Online MBA-PK  
MAJU-Two years MBA-PK  
IMSciences, Peshawer-PK

**MSC/PhD**

Markfield Institute of Higher Education (MIHE) UK (PhD)  
Durham University, UK (PhD)  
International Islamic University, Islamabad (PhD)  
INCEIF, Malaysia (PhD)  
La Trobe University, Australia  
London School of Business and Finance, UK  
University of Reading, UK  
University of Nottingham, UK  
Qatar University, Qatar  
Salford University, UK

## **M.S (IR) at BUIC**

### **The Case**

1. Currently the H&SS Department has no post graduate program.
2. The department has three PhDs in IR at H&SS department at BUIC.
3. The department intends to start an M.S program of IR (evening) for fall 2016.
4. Detailed roadmap of Proposed program in attached as annexure A.
5. There was consensus amongst members of the DBOS that the students of IR stream are interested in higher studies for which they get admission in other universities. Therefore, it is highly desired that the MS in IR must be started in BUIC.
6. The launch of MS (IR) would enhance the academic status of department as well as research input.
7. Permission to launch MS International Relations be granted please.
8. Financial: Within limits allocated for purchase of books, journals and other content.

### **Annexure**

#### **Launching an M.S. International Relations**

##### **1. Significance of M.S. Programme**

- Research Programme benefits are more reputational than material
- Bahria University will join the Big leagues
- Research output in the department will increase
- HEC Ranking will increase
- A substantial number of BU students get admission in other universities for higher studies.

##### **2. Do we fulfill the requirements for launching the programme?**

- a varsity should have at least two full-time PhD faculty members in a department offering MS, MPhil programme.
- The H&SS department has TWO full time PhD FMs in the relevant field.
- ONE FM is waiting for his final PhD defense which is expected to be done before the launch of program.

##### **3. Eligibility Criteria for the M.S. Programme**

- Candidate must hold 16 years of education from a recognized university in International Relations, Anthropology, Sociology, Development Studies, Political

Science, Gender Studies, Behavioral Sciences and Pakistan Studies or in a related field.

- As per BU rules
- Admission test and a Board Interview

#### 4. CURRICULUM FOR MS (HONS) SCHEME OF STUDIES

- MS 2-YEAR PROGRAM (30 CREDIT HOURS) Following is the scheme of studies for 2 – Year MS in International Relations for 24 and 6 credit hours research program, respectively:

##### 1st Semester – MS 1st Year

S No	Course Title	Credit Hours
1	International Relations: Advanced Theory and Practice	4
2	Advanced Research Methodology	4
3	Seminar on Contemporary Regional and Global Issues	4
	Total	12

##### 2nd Semester – MS 1st Year

S. No	Course Title	Credit Hours
1	Optional-I	3
2	Optional-II	3
3	Optional-III	3
4	Optional-IV	3
	Total	12

<u>Semester</u>	<u>Name of the Subject</u>	<u>Credits</u>
<u>Third and Fourth</u>	<u>Thesis</u>	<u>6</u>

#### LIST OF OPTIONAL COURSES

- Following is the list of optional courses to be offered by Departments concerned the course contents and the core/recommended books too would be provided by the teacher/s at the time of the offering of a course:
  - i. Ethnic Conflict in Global Perspective
  - ii. Power Politics and Beyond
  - iii. Gulf War and its Consequences
  - iv. Forecasting in International Relations
  - v. Structural Adjustment Program – (in the 3rd world countries - Role of IMF, World Bank, and WTO)
  - vi. Role of Non-State Actors in International Relations
  - vii. Evolution and Development of International Political Philosophy
  - Viii Politics of South Asia
  - ix. Ethnic Conflict in Global Perspective
  - X. Politics of Middle East
  - Xi . Internal Law and Use of Force
  - Xii. Contemporary Trends in International Law
  - Xiii. Comparative Analyses of Foreign Policy of Major Powers (any two)
  - Xiv. Foreign Policy Analyses

- Xv. Role of International Financial Institutions in International Relations
- Xvi. An Analysis of Pakistan's Foreign Policy
- Xvii. Politics and Security of Asia-Pacific Region
- xviii. National Security Issues in Contemporary Pakistan
- Xix. Contemporary Environmental Issues
- Xx. Major Issues of Muslim World
- Xxi. Conflict and Cooperation in South Asia
- Xxii. Peace Building in Post-conflict Societies
- Xxiii. International Organizations
- Xxiv. Power Sharing in Multiethnic States
- Xxvi. Arms Control and International Security
- Xxvii. Politics of Human Rights
- Xxviii. Contemporary Political Theories

**Proforma for Beginning  
New Academic Programmes**

**MS in International Relations**

A. ACADEMIC DETAILS	
(1)	<b>Faculty / Institute / Department:</b> Department of Humanities and Social Sciences, Bahria University, Islamabad Campus (BUIC)
(2)	<b>Name of the Program:</b> Master of Science in Media Studies
(3)	<b>Duration:</b> 2 Years ( 4 Semesters)
(4)	<b>Venue (s):</b> Department of Humanities and Social Sciences, Bahria University, Islamabad Campus, Shangrila Road Islamabad.
(5)	<b>Whether the proposed program will be offered in (morning/evening/weekend)?</b> Evening
(6)	<b>Number of <u>Extra</u> Faculty Member(s) or Skilled-Worker(s) Required?</b> (Write the faculty members and skilled-workers, fulltime/Visiting, required in <u>addition</u> to the existing strength, along with their qualifications)  ONE permanent Faculty member
(7)	<b>Any <u>extra</u> class room(s) required? If yes, how many? And what will be their capacities required?(provide details)</b>  NO – Present classrooms shall be used.
(8)	<b>Any <u>extra</u> laboratory/laboratories required? If yes, how many? And what <u>additional</u> equipment will be required?(provide details of equipment, use extra sheet if necessary)</b> Nil
(9)	<b>Minimum Entry Level:</b> <ul style="list-style-type: none"> <li>16 years of education from HEC recognized educational universities / institutes, students with background of Political Science, International Relations, Pakistan Studies and relevant subjects.</li> <li>CGPA 2.50 or above in the final degree, on hand, if degree obtained from a CGPA based system.</li> <li>Minimum 50% marks if degree obtained from a non-CGPA degree.</li> </ul>



	<ul style="list-style-type: none"> <li>Must pass Bahria University Admission Test. And / Or</li> <li>NTS-GAT General with 50 marks obtained in less than two years prior to admissions.</li> </ul>
(10)	<b>Admission Criteria:</b> As per BU Policy
(11)	<b>Date of Commencement:</b> Fall 2016
(12)	<b>Mode of Study / Examination:</b> (Semester / Annual / Bi-Annual) Semester System
(13)	<b>Brief Description &amp; Rationale of the Program:</b> <ul style="list-style-type: none"> <li>MS (IR) will add diversity to the programs being conducted at Islamabad Campus of Bahria University.</li> <li>The program would be taken to 26th Academic Council of the University for approval.</li> <li>Many of the IR undergrads from BU take admissions in various universities of the twin cities. There is an ever rising demand by the students to start MS (IR) program at BUIC.</li> <li>The department has THREE PhD PFMs in the field while final defense is awaited for another PFM. Having such a healthy faculty, it is necessary to start MS (IR) program at BUIC.</li> </ul>
(14)	<b>Complete Plan of Studies:</b> Department of Humanities and Social Sciences, BUIC will follow the Road Map of MS (IR) which is expected to be approved by the 26 <sup>th</sup> ACM. (Attach complete roadmap with semester wise breakup)-attached
(15)	<b>Course Outlines</b> (Attach course description for each course along with pre-requisite courses required) - attached
(16)	<b>Examination Policy:</b> We will follow the examination Policy Bahria University
(17)	<b>Number of Admissions Expected for First Intake:</b> 10-15 students
(18)	<b>Number of Admissions Planned/Expected for Subsequent Intakes:</b> 20 % increase every semester
(19)	<b>Date of Approval by the Board of Study?</b> (Write the date. If approval is conditional, write all the conditions) Already Done

## B. FINANCIAL ANALYSIS

(1)	<b>Any Agency (Public/Private) Funding this Program (Fully/Partially)?</b> (Provide complete details including extent of funding and mode of disbursement) NIL
(2)	<b>Expected Earning from First Intake:</b> 1.2 million (per semester)
(3)	<b>Projected Earnings for the Next Five Years:</b> 20 % increase per semester
(4)	<b>Total Estimated Salaries of all Extra Human Resources per Annum:</b> Rs 0.7million/semester
(5)	<b>Cost of Extra Laboratory Equipment/Tools (if required):</b> NIL
(6)	<b>Cost of Extra Books for the Library: (if required):</b> Approximately Rs. 0.2 million
(7)	<b>If the Venue is Hired, provide Annual Rental Expenses and Cost of other Fixtures:</b> NIL
(8)	<b>Miscellaneous Expenses Required for Starting the Program:</b> (Write all expenses required for Furniture, Marketing, Advertisements, Prospectus-Printing etc.) Approximately Rs. 1.5 million per year for maintenance and upgrading classroom / research lab.
(9)	<b>Total Annual Recurring Expenditures Required in Subsequent Years: (like Salaries, Advertisements, Stationeries etc)</b> 01 millions

## C. PROGRAMME VIABILITY

(1)	<b>Total Expenditures Required: Add B(4) to B(8)</b> ≈ Rs. 2.2 million per semester
(2)	<b>Net Expenditures Required: Subtract B(1) from C(1)</b> ≈ Rs. 2.2 million per semester
(3)	<b>Net Earnings in First Year: Subtract C(2) from B(2)</b> ≈ -1.2 million rupees

(4)	<b><i>Projected Annual Gross Earning in Subsequent Years:</i></b> $\approx + 0.7$ million rupees per annum , will differ with intake
(5)	<b><i>Projected Annual Net Earning in Subsequent Years:</i></b> <b><i>Subtract B(9) from C(4)</i></b> The program shall become more profitable in coming years.

Signed and forwarded by Dean/Director: \_\_\_\_\_  
Dated: \_\_\_\_\_

## Launch of New Ms (Information Security) Program

### The Case

1. MS (Information Security) is a new 2 year master's degree program that intends to equip students with the strong foundation of theoretical and practical concepts eminent for understanding threats, attacks and countermeasures along with policies and standards related to information security. The program will provide the ability to identify, develop, and implement secure information systems that are in line with organizational requirements.
2. Bahria University has recently collaborated with Yasar University Izmir Turkey for further strengthening its academic and research profile. In this regard, it is worth mentioning that MS Cyber Security is a well-established program in Yasar University. The launch of MS (Information Security) program at Bahria University will provide its students and faculty to utilize the expertise of Yasar University in the domain of information security.

### Annexure

### MS – Information Security (Proposed Program Outline)

#### Mission Statement

The program intends to equip students with the strong foundation of theoretical and practical concepts eminent for understanding threats, attacks and countermeasures along with policies and standards related to information security. The program will provide the ability to identify, develop, and implement secure information systems that support organizational requirements.

#### Program Objectives:

The objectives of this program are:

- To acquire a detailed understanding of information security challenges and solutions in modern networks and software systems
- To gain expertise in both theory and practices of information security
- To gain interdisciplinary knowledge of impact of information security on business and management
- To acquire up-to-date knowledge of information security policies, standards, laws along with moral and ethical issues of the domain
- To fulfill growing needs of information security experts that are well equipped to contribute and lead in industry, academia and research

#### Eligibility Criteria:

4 years degree in BS/BSE/BEE/BET/BSCS/CE/IT/Electronics/equivalent with minimum 130 Cr Hrs and CGPA 2.5/4.0 (Semester System) or 50% marks (Annual System). NTS-GAT (General) or GRE passed with 50% marks. Result. Result of NTS-GAT (General) or GRE must be submitted within six months after the admission.

#### Semester 1

Course Code	Course Title	Cr Hrs
	Number Theory / Algebra and Number Theory / Essentials of Cryptography	03
EET-710	Advanced Computer Networks	03

	Computer and Network Security	03
	Total	09

### Semester 2

Course Code	Course Title	Cr Hrs
CSC-720	Advanced Operating Systems	03
	Advanced Cryptography and Cryptanalysis	03
ESC-501	Research Methodology	03
	Total	09

### Semester 3

Course Code	Course Title	Cr Hrs
	Information Security Management	03
ESC-500 / Elective Code	Thesis-I / Elective-I	03
	Elective-II	03
	Total	09

### Semester 4

Course Code	Course Title	Cr Hrs
ESC-500 / Elective Code	Thesis-II / Elective-III	03
	Elective – IV	03
	Total	06
	<b>TOTAL CR HRS</b>	<b>33</b>

### Core Courses

S. No	Course Code	Course Title	Cr Hrs
1		Number Theory / Algebra and Number Theory / Essentials of Cryptography	03
2	EET-710	Advanced Computer Networking	03
3		Computer and Network Security	03
4	CSC-720	Advanced Operating Systems	03
5		Advance Cryptography and Cryptanalysis	03
6		Information Security Management	03

### University Requirement

Sr. No	Course Code	Course Title	Cr Hrs
1	ESC-501	Research Methodology	03

### Electives

Sr. No	Course Code	Course Title	Cr Hrs
1	ESC-500	Thesis	06
2		Advanced System Security	03
3		Information Hiding	03
4		Wireless Network Security	03
5		Cloud Computing Security	03
6		Electronic Warfare	03
7		Computer and Network Forensics	03

8		Ethical Hacking	03
9		Cyber Crimes and Laws	03
10		Secure E-Commerce	03
11		Advanced Design and Analysis of Algorithms	03
12		Quantum Cryptography	03
13	EET-553	Information theory and coding	03
14		Algebraic Cryptanalysis	03
15		Stochastic Process / Advanced Probability and Statistics	03
16		Security Analysis of a Communication System	03
17		Penetration Testing and Vulnerability Analysis	03
18	EET-556	Mobile Communication and Networking	03
19	EET-520	Network Administration and Management	03
20	EET-519	Distributed Networking	03

### New Programme Proposal

(A) Academic details	
(1)	<b>Faculty /institute /department</b> Engineering Sciences/BU Islamabad Campus/Department Computer Science
(2)	<b>Name of program :</b> MS (Information Security)
(3)	<b>Duration :</b> 2 years (4 Semesters)
(4)	<b>Venus(s):</b> Islamabad Campus
(5)	<b>Whether the proposed program will be offered in (morning/evening/weekend)?:</b> Evening
(6)	<b>Number of <u>Extra</u> Faculty Member(s) or skilled-worker(s) Required? : Two Ph.D. Faculty</b> Administrative staff will perform their task in the evening as an additional duties as per BU rules.
(7)	<b>Any <u>extra</u> class room(s) required? If yes, how many? and what will be their capacities required?(provide details) No</b> No extra class rooms will be required, the existing resources available in the morning session will be utilized in the evening.
(8)	<b>Any <u>extra</u> laboratory /laboratories required? If yes, how many? And what <u>additional</u> equipment's will be required? (provide detail of equipment's ,use extra sheet if necessary): Yes</b> One specialized lab for Information Security will be required for R&D activities
(9)	<b>Minimum Entry level :</b> 16 years education in computer science or information technology, Computer Engineering, Software Engineering education.
(10)	<b>Admission criteria :</b> CGPA 2.5 and passing entry test of Bahria University.
(11)	<b>Proposed date of Commencement :</b> Fall 2016 Semester
(12)	<b>Mode of study/Examination:</b> Semester System
(13)	<b>Brief Description &amp; Rationale of program:</b> The department of CS at Bahria University Islamabad campus presently offers BS (CS), BS (IT), MS (TN), MS (CS) and PhD (CS) programs. Considering the best available resources (i.e. laboratories and class rooms) in the evening session and the revival of the CS/IT and Information Security industry in the recent years , the MS (Information Security) program is suggested to be launched with effect from Fall 2016 semester.
(14)	<b>Complete Plan of studies</b>

	<b>(Attach complete roadmap with semester/year wise backup )</b> After consultation with Yasar University, it will be placed before Academic Council at Table.
<b>(15)</b>	<b>Course Outlines</b> <b>(Attach course description for each course along with pre-requisite course required and recommended book )</b>  After consultation with Yasar University, it will be placed before Academic Council at Table.
<b>(16)</b>	<b>Examination Policy</b> <b>(Attach separate sheet to provide the following details)</b> As per BU rules for Engineering Sciences Faculty.
<b>(17)</b>	<b>Number of admission expected for first intake: 15 (worst case situation)</b>
<b>(18)</b>	<b>Number of Admission Planned/Expected for Subsequent Intake: 15 students with two intakes per year (Fall and Spring semester)</b>
<b>(19)</b>	<b>Date of approval by the board of study?</b> <b>(Write the date. If approval is conditional, write all conditions )</b> Faculty Board of Studies (Engineering Sciences) - 10 March 2016

#### **(B) Financial Analysis:**

<b>(1)</b>	<b>Any Agency (Public/private ) Funding this Program (Fully/Partially)?:</b> No
<b>(2)</b>	<b>Expected Earning from First Intake :</b> 82,106 x 15 = 1231,590 (one semester)
<b>(3)</b>	<b>Projected Earnings for the Next Four Years:</b> <b>Will be placed on table before Academic Council</b>
<b>(4)</b>	<b>Total Estimated Salaries of Visiting Faculty Members per Annum:</b>  Will be placed on table before Academic Council
<b>(5)</b>	<b>Cost of <u>Extra</u> Laboratory Equipment/tools(if required):</b>  Will be placed on table before Academic Council
<b>(6)</b>	<b>Cost of <u>Extra</u> Books for the Library (if required):</b> 300,000/-
<b>(7)</b>	<b>If the Venue is hired provide Annual Rental Expenses and Cost of other Fixtures:</b>  Nil
<b>(8)</b>	<b>Miscellaneous Expenses Required for starting the program :Nil</b>
<b>(9)</b>	<b>Total Annual Recurring Expenditures Required in Subsequent Year(like Salaries ,Advertisements, Stationeries etc)</b>  Will be placed on table before the Academic Council

## Launch of New MCS (Master of Computer Science) Program

### The Case

1. The program is 2 ½ year master of computer science degree program especially designed for candidates having bachelor degree (14 years) offered by Government Colleges in all provinces either in cities as well as in capital territory. The main objective of this program is to equip these students with the requisites computing skills and knowledge to develop and design software products in the software/IT industries within the country as well as abroad. Graduates with this degree will also strengthen our MS (CS) and MS (T&N) programs intake. Graduates of this program will also be able to meet the challenging requirements of IT industry in Pakistan special after completion of China-Pakistan Economic Corridor.
2. This program is successfully running in the following public sectors Universities:
  - a. Quaid-e-Azam University, Islamabad
  - b. International Islamic University, Islamabad
  - c. Fatima Jinnah Women University, Rawalpindi
  - d. Arid Agriculture University, Rawalpindi
  - e. NUML University, Islamabad
  - f. University of Peshawar, Peshawar
  - g. University of Punjab, Lahore
3. The detailed road-map, cost-benefit analysis, budget and feasibility of the program is attached as Annexure.
4. The case was presented by HOD (CS), Islamabad Campus and was strongly supported by HODs (CS) Karachi and Lahore Campuses.
5. All other members of the FBOS had strong observations including:
6. The program doesn't match with the long term vision and plan of the university, and faculty of Engineering Sciences
7. The universities are moving to 4 years BS and 2 years MS programs and none of the reputed universities has launched the said program during the last 10 years.
8. The agenda has twice been declined at FBoS and ACM in the last couple of years and nothing has changed since then to launch the program.

### Annexure

#### Mission statement:

This is a two year master's degree program especially designed for candidates having bachelor degree (14 years) have been offered by Government Colleges in all provinces as well as in Islamabad territory. The mission of this program is to equip students with the requisites knowledge and abilities to evaluate, develop and implement the techniques and technologies within the field of computer science. Moreover, it emphasizes on the methods for the construction of computer programs, including theoretical foundations as well as the practical ability to develop products and systems.

**Program Objective:**

The objectives of the MCS (Master of Computer Science) program are:

1. To provide computing science education for individuals who are motivated to acquire new technical and scientific skills in this discipline.
2. To provide students with the tools needed to compete in software industry locally as well as abroad.
3. To offer students a solid background in core areas and exposure to cutting-edge technologies in computer science for attaining further education in these disciplines.

**Eligibility Criteria:**

B.Sc. in any discipline/B.Com (14 years education) or BBA/BE in non-Computing discipline (16 years education) or equivalent with minimum 50% marks or CGPA with 2.5 from HEC recognized institutions.

Candidates with BS (CS)/BSE/BE (Computer Engineering) are not eligible for this program.

**Proposed Road Map**  
**MCS (Master of Computer Science)**

**Road Map Fall 2016****Semester 0:**

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
None	GSC-221	Discrete Mathematics	3	0	3	17
None	HSS-120	Communication Skills	3	0	3	
None	CSC-110	Introduction to Information & Communication Technology	2	0	2	
None	CSL-110	Introduction to Information & Communication Technology Lab	0	1	1	
EEN-210	CEN-120	Digital Logic Design	3	0	3	
EEN-210	CEL-120	Digital Logic Design Lab	0	1	1	
None	CSC-113	Computer Programming	3	0	3	
None	CSL-113	Computer Programming Lab	0	1	1	

**Semester 1:**

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
SEN-213	SEN-220	Software Engineering	3	0	3	18
GSC-105	GSC-122	Probability and Statistics	3	0	3	
CSC-113	CSC-210	Object Oriented Programming	3	0	3	
CSC-113	CSL-210	Object Oriented Programming Lab	0	1	1	
SEN-213	CSC-220	Database Management System	3	0	3	
SEN-213	CSL-220	Database Management System Lab	0	1	1	
CEN-120	CEN-221	Computer Architecture & Organization	3	0	3	
CEN-120	CEL-221	Computer Architecture & Organization Lab	0	1	1	

**Semester 2:**

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
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CSC-113	SEN-310	Web Engineering	2	0	2	17
CSC-113	SEL-310	Web Engineering Lab	0	1	1	
HSS-120	HSS-320	Technical Writing & Presentation Skills	3	0	3	
NONE	CEN-222	Data Communication and Networking	3	0	3	
NONE	CEL-222	Data Communication and Networking Lab	0	1	1	
CSC-113	CSC-221	Data Structure and Algorithm	3	0	3	
CSC-113	CSL-221	Data Structures and Algorithm Lab	0	1	1	
CSC-210	CSC-313	Visual Programming	2	0	2	
CSC-210	CSL-313	Visual Programming Lab	0	1	1	

### Semester 3:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
CEN-221	CSC-320	Operating System	3	0	3	19
CEN-221	CSL-320	Operating System Lab	0	1	1	
CSC-221	CSC-321	Design and Analysis of Algorithms	3	0	3	
CSC-313	CSC-341	Mobile Application Development	2	0	2	
CSC-313	CSL-341	Mobile Application Development Lab	1	0	1	
SEN-220	SEN-320	Human Computer Interaction	3	0	3	
NONE	ESC-498	Project-I	0	3	3	
		Elective-1(3+0 or 2+1)	3	0	3	

### Semester 4:

Pre-requisite	Course code	Course Title	Lec	Lab	CR	CR/Sem
CEN-222	CSC-407	Information Security	3	0	3	15
CSC-210	CSC-411	Artificial Intelligence	2	0	2	
CSC-210	CSL-411	Artificial Intelligence Lab	0	1	1	
SEN-220	SEN-410	Software Project Management	3	0	3	
		Elective-2 (3+0 or 2+1)	3	0	3	
	ESC-499	Project-II	0	3	3	
						86

### List of Electives

Pre-requisite	Course code	Course Title	Lec	Lab	CR
CSC-321	CSC-521	Advanced Design and Analysis of Algorithm	3	0	3
CSC-220	CSC-468	Advanced Databases	2	0	2
CSC-220	CSL-468	Advanced Databases Lab	0	1	1
CSC-210	CSC-444	Computer Graphics	2	0	2
CSC-210	CSL-444	Computer Graphics Lab	0	1	1
CSC-310	CSC-456	Distributed Computing	2	0	2
CSC-310	CSL-456	Distributed Computing Lab	0	1	1
SEN-320	SEN-456	Usability Engineering	3	0	3
CSC-323	CSC-451	Theory of Programming Languages	3	0	3
SEN-220	SEN-457	Software Design and Architecture	2	0	2
SEN-220	SEL-457	Software Design and Architecture Lab	0	1	1

CEN-221	CEN-460	Parallel Processing	3	0	3
CSC-220	SEN-458	Software Requirement Engineering	3	0	3
CSC-320	CEN-453	Real Time System	3	0	3
SEN-310	SEN-421	Semantic Web	3	0	3
CSC-468	CSC-452	Data Mining	3	0	3
CSC-468	CSC-454	Data Warehousing	3	0	3
CSC-444	SEN-493	Multimedia Systems	2	0	2
CSC-444	SEL-493	Multimedia Systems Lab	0	1	1
SEN-310	CSC-484	Content Management	2	0	2
SEN-310	CSL-484	Content Management Lab	0	1	1
CSC-444	CEN-444	Digital Image Processing	2	0	2
CSC-444	CEL-444	Digital Image Processing Lab	0	1	1
CSC-458	CSC-486	Geographical Information System	2	0	2
CSC-458	CSC-486	Geographical Information System Lab	0	1	1
NONE	GSC-445	Operation Research	3	0	3
SEN-213	CSC-458	Management Information System	3	0	3
CSC-210	CSC-459	Client Server Programming	2	0	2
CSC-210	CSL-459	Client Server Programming Lab	0	1	1
CEN-222	EET-455	Wireless Communications	2	0	2
CEN-222	EEL-455	Wireless Communications Lab	0	1	1
CEN-222	CEN-451	Data Encryption and Security	3	0	3
GSC-210	EEN-313	Signals and Systems	2	0	2
GSC-210	EEL-313	Signals and Systems Lab	0	1	1
EEN-222	EEN-325	Digital Signal Processing	2	0	2
EEN-222	EEL-325	Digital Signal Processing Lab	0	1	1
CEN-221	CEN-321	Microprocessor & Interfacing	2	0	2
CEN-221	CEL-321	Microprocessor & Interfacing Lab	0	1	1
GSC-121	CEN-450	Simulation and Modeling	2	0	2
GSC-121	CEL-450	Simulation and Modeling Lab	0	1	1
CSC-411	CSC-449	Neural Networks& Fuzzy Logic	3	0	3
CSC-411	SEN-455	Knowledge Based Management System	3	0	3
CSC-411	CSC-441	Natural Language Processing	3	0	3
CSC-411	CEN-458	Robotics	2	0	2
CSC-411	CEL-458	Robotics Lab	0	1	1
CSC-411	CSC-466	Introduction to Biometrics	2	0	2
CSC-411	CSL-466	Introduction to Biometrics Lab	0	1	1
SEN-310	SEN-422	Semantic Computing	3	0	3
CSC-313	SEN-448	Software Application for Mobile Device	3	0	3
CSC-313	CSC-319	Game Development and Design	2	0	2
CSC-313	CSL-319	Game Development and Design Lab	0	1	1
CSC-220	CSC-342	Introduction to Cloud Computing	3	0	3

### Student Fee

Semester	Students			Total Fee		
	Fresh	Existing	Total	Fresh	Existing	Total
Fall 2016	30	0	30	2,091,000	0	2,091,000
Spring 2017	30	30	60	2,091,000	1320000	3,411,000
Fall 2017	30	60	90	2,091,000	2722500	4,813,500
Spring 2018	30	90	120	2,091,000	4372500	6,463,500
Fall 2018	30	120	150	2,091,000	6022500	8,113,500
Spring 2019	30	150	180	2,091,000	7590000	9,681,000
Fall 2019	30	180	210	2,091,000	9075000	11,166,000
Spring 2020	30	210	240	2,091,000	10065000	12,156,000

### Visiting Faculty Salary

Semester	Average Rate/Per Contact Hr		No of Credit Hours		No of Contact Hours/ per semester		Total Salary/Semester		
	Faculty	Lab Engr.	Teaching	Labs	Total Lectures	Labs Hrs	Faculty	Lab Engr.	Grand Total
Fall 2016	1800	1000	15	1	240	48	432000	48000	480000
Spring 2017	1800	1000	30	2	480	96	864000	96000	960000
Fall 2017	1800	1000	45	4	720	192	1296000	192000	1488000
Spring 2018	1800	1800	63	6	1008	288	1814400	288000	2102400
Fall 2018	1800	1000	78	11	1248	528	2246400	528000	2774400
Spring 2019	1800	1000	94	14	1504	672	2707200	672000	3379200
Fall 2019	1800	1000	108	18	1728	864	3110400	864000	3974400
Spring 2020	1800	1000	117	21	1872	1008	3369600	1008000	4377600

### Cost/Benefit Analysis

Semester	Cost			Income	Difference
	Salaries	Misc.	Total	Fee	
Fall 2016	480000	500,000	980,000	2,091,000	1,111,000
Spring 2017	960000	500,000	1,460,000	3,411,000	1,951,000
Fall 2017	1488000	500,000	1,988,000	4,813,500	2,825,500
Spring 2018	2102400	500,000	2,602,400	6,463,500	3,861,100
Fall 2018	2774400	500,000	3,274,400	8,113,500	4,839,100
Spring 2019	3379200	500,000	3,879,200	9,681,000	5,801,800
Fall 2019	3974400	500,000	4,474,400	11,166,000	6,691,600
Spring 2020	4377600	500,000	4,877,600	12,156,000	7,278,400

# Feasibility

MCS (Master of Computer Science)

Department of Computer Science

Bahria University, Islamabad Campus

(A) Academic details	
(1)	<b>Faculty /institute /department</b> Engineering Sciences/BU Islamabad Campus/Department Computer Science
(2)	<b>Name of program :</b> MCS (Master of Computer Science)
(3)	<b>Duration :</b> 2 ½ years (5 Semesters)
(4)	<b>Venus(s):</b> Islamabad Campus, Karachi Campus and Lahore Campus
(5)	<b>Whether the proposed program will be offered in (morning/evening/weekend)?:</b> Evening
(6)	<b>Number of <u>Extra</u> Faculty Member(s) or skilled-worker(s) Required? : No</b> The program will be offered in the evening and existing faculty members will work as visiting faculty. Administrative staff will perform their task in the evening as an additional duties as per BU rules.
(7)	<b>Any <u>extra</u> class room(s) required? If yes, how many? and what will be their capacities required?(provide details) No</b> No extra class rooms will be required, the existing resources available in the morning session will be utilized in the evening.
(8)	<b>Any <u>extra</u> laboratory /laboratories required? If yes, how many? And what <u>additional</u> equipment's will be required? (provide detail of equipment's ,use extra sheet if necessary): No</b> No extra laboratories will be required, the existing resources available in the morning session will be utilized in the evening.
(9)	<b>Minimum Entry level:</b> 14 years education in sciences or commerce or 16 years education in non-computing discipline.
(10)	<b>Admission criteria:</b> 50% marks as an aggregate in B.Sc. (in any discipline)/B.Com or BBA/BE (non-computing discipline) with minimum CGPA 2.5 and passing entry test of Bahria University.
(11)	<b>Proposed date of Commencement :</b> Fall 2016 Semester
(12)	<b>Mode of study/Examination:</b> Semester System
(13)	<b>Brief Description &amp; Rationale of program:</b> The department of CS at Bahria University Islamabad campus presently offers BS (CS), BS (IT), MS (TN), MS (CS) and PhD (CS) programs. Considering the best available resources (i.e. laboratories and class rooms) in the evening session and the revival of the CS/IT industry in the recent years, the MCS program is suggested to be launched with effect from Fall 2016 semester. This program will help talented students with 14 years education (from government colleges) to get respectable jobs in the software and IT industries within the country as well as abroad.
(14)	<b>Complete Plan of studies</b> <b>(Attach complete roadmap with semester/year wise backup )</b> Attached above
(15)	<b>Course Outlines</b> <b>(Attach course description for each course along with pre-requisite course required and recommended book )</b> Attached above

(16)	<b>Examination Policy</b> <b>(Attach separate sheet to provide the following details)</b> As per BU rules for Engineering Sciences Faculty.
(17)	<b>Number of admission expected for first intake:</b> 30 (worst case situation)
(18)	<b>Number of Admission Planned/Expected for Subsequent Intake:</b> 30 students with two intakes per year (Fall and Spring semester)
(19)	<b>Date of approval by the board of study?</b> <b>(Write the date. If approval is conditional, write all conditions )</b> Faculty Board of Studies (Engineering Sciences) - 10 March 2016

<b>(B) Financial Analysis:</b>	
(1)	<b>Any Agency (Public/private ) Funding this Program (Fully/Partially)?:</b> No
(2)	<b>Expected Earning from First Intake :</b> Rs. 1111,000/- (Fee)
(3)	<b>Projected Earnings for the Next Four Years:</b>  Details Attached
(4)	<b>Total Estimated Salaries of Visiting Faculty Members per Annum:</b>  Details Attached
(5)	<b>Cost of <u>Extra</u> Laboratory Equipment/tools(if required):</b>  Nil
(6)	<b>Cost of <u>Extra</u> Books for the Library (if required):</b>  Nil
(7)	<b>If the Venue is hired provide Annual Rental Expenses and Cost of other Fixtures:</b>  Nil
(8)	<b>Miscellaneous Expenses Required for starting the program :</b>  Attached
(9)	<b>Total Annual Recurring Expenditures Required in Subsequent Year(like Salaries ,Advertisements, Stationeries etc)</b> Details attached

## **Proposal for Launching MS Mathematics Program in Bahria University**

### **The Case**

1. Over the past decade, the demand for mathematicians has expanded greatly in both industry and academia, primarily as a result in the availability of more complex technology and new potential applications in a myriad of fields.
2. Recognizing these needs, Bahria University's Electrical Engineering department has taken the initiative to start a Master program, which will help promote new methods for integrating people from engineering and management sciences into mathematics program.
3. The department wants to start MS mathematics program with special emphasis on computational mathematics in order to fill the gap between academia and industry. Major aim is, not to replicate exactly what the other universities are already doing to achieve the aforementioned objective, but to complement what is missing.
4. The proposed program will help increase enrollment at Bahria University; increase Bahria's visibility through the addition of this modern interdisciplinary program; and stimulate research collaborations and funding within Bahria and between the University and industry.
5. The departments will need two PhD's to run the program
6. The curriculum/ syllabus of proposed program is forwarded to ACM after the approval of FBOS for consideration.

### **Financial Effect**

7. Honorarium of the two PhDs.

### **Recommendations:**

8. The program may be started after getting approval from HEC.
9. The details are attached as Annexure.

### **Establishment / HR Effect if any**

10. Hiring two PhDs to run the program.

### **Annexure**

#### **Mission Statement**

The mission of Master of Science (Mathematics) program is to provide an environment where students can learn and become competent users of mathematics and mathematical applications.

Through the combination of core and specialized courses, engineers and mathematicians will be able to excel in any discipline which makes use of mathematics.

## Program Objectives

The objectives of MS program in Mathematics are to provide its students with a thorough knowledge of pure/applied mathematics and to develop their expertise in applying the methods and tools of mathematics to problems in science and engineering. Furthermore, the program aims at bridging the gap between academia and industry with a view towards solving real-world modeling and computational problems that arise in realistic situations.

The aforementioned objectives are achieved by providing the students:

- Advanced knowledge of mathematics, so as to maintain high employability, and an ability to adapt, to develop and apply new technology.
- Enhanced foundation for enduring learning.

## ROAD MAP

FIRST YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Discrete Mathematics and Algebra	3	1	Advanced Differential Equations/ Analysis II	3
2	Analysis I	3	2	Elective I	3
3	Geometry and Topology	3	3	Elective II	3
Total		9			9

SECOND YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Elective III	3	1	Elective V	3
2	Thesis I/ Elective IV	3	2	Thesis II/Elective VI	3
Total		6			6

### OPTION 1:

- Pure Mathematics
- Computational Mathematics

### OPTION 2:

- Pure Mathematics
- Applied Mathematics
- Computational Mathematics

## PURE MATHEMATICS

FIRST YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Discrete Mathematics and Algebra	3	1	Advanced Differential Equations	3
2	Analysis I	3	2	Elective I	3
3	Geometry and Topology	3	3	Elective II	3
<b>Total</b>		<b>9</b>			<b>9</b>
SECOND YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Elective III	3	1	Elective V	3
2	Thesis I/ Elective IV	3	2	Thesis II/Elective VI	3
<b>Total</b>		<b>6</b>			<b>6</b>

## APPLIED MATHEMATICS

FIRST YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Discrete Mathematics and Algebra	3	1	Analysis II	3
2	Analysis I	3	2	Elective I	3
3	Geometry and Topology	3	3	Elective II	3
<b>Total</b>		<b>9</b>			<b>9</b>
SECOND YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Elective III	3	1	Elective V	3
2	Thesis I/ Elective IV	3	2	Thesis II/Elective VI	3
<b>Total</b>		<b>6</b>			<b>6</b>

## COMPUTATIONAL MATHEMATICS

FIRST YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Discrete Mathematics and Algebra	3	1	Analysis II	3
2	Analysis I	3	2	Elective I	3
3	Geometry and Topology	3	3	Elective II	3
<b>Total</b>		<b>9</b>			<b>9</b>



SECOND YEAR					
FIRST SEMESTER			SECOND SEMESTER		
S#	Course Title	Cr. Hr	S#	Course Title	Cr. Hr
1	Elective III	3	1	Elective V	3
2	Thesis I/ Elective IV	3	2	Thesis II/Elective VI	3
<b>Total</b>		<b>6</b>			<b>6</b>

### PROPOSED LIST OF ELECTIVES:

PURE MATHEMATICS	APPLIED MATHEMATICS	COMPUTATIONAL MATHEMATICS
Adv. Topics in Algebra	Applied Differential Equations	Adv. Topics in Combinatorics
Adv. Topics in Combinatorics	Advanced Differential Equations	Adv. Topics in Stochastic Processes
Advanced Differential Equations	Computational Sciences & Numerical Analysis	Artificial Neural Networks
Adv. Topics in Stochastic Processes	Computational Methods	Adv. Topics in Topology
Adv. Topics in Topology	Computational Fluid Dynamics	Applied Topology
Banach Lattices	Cosmology	Actuarial Methods
Combinatorics	Convex Analysis	Banach Lattices
Commutative Algebra & Algebraic Geometry	Continuum Mechanics	Cryptography
Complex Analysis	Computational Biology	Computational Methods
Computational Mechanics	Computational Electromagnetics	Computational Fluid Dynamics
Differential Geometry	Discrete Applied Mathematics	Computational Sciences & Numerical Analysis
Stochastic Processes	Detection & Estimation	Commutative Algebra & Algebraic Geometry
Ergodic Theory & Dynamical Systems	Elasticity	Computational Electromagnetics
Functional Analysis	Ergodic Theory & Dynamical Systems	Computational Complexity & Approximate Functions of a Complex Variable
Fuzzy Logic/ Fuzzy Algebra	Electrodynamics	Computational Biology
Financial Derivatives	Fuzzy Algebra/ Fuzzy Logic	Computational Mechanics
Graph Theory	Finance Theory & Asset Pricing	Computational Geometry
Intro to Operator Theory	Fixed Point Theory	Complex Analysis
Logic	Fourier Analysis with Applications to Signal Processing & Differential Eqs	Discrete Applied Mathematics
Modern Algebra	Graph Theory	Data Mining
Number Theory	Info & Coding Theory	Econometrics
Numerical Analysis		

Nonlinear Differential Equations and Dynamical Systems	Magnetohydrodynamics	Fuzzy Logic/ Fuzzy Algebra
Advanced ODEs	Advanced Numerical Analysis	Finance Theory & Asset Pricing
Advanced PDEs	Nonlinear Differential Equations and Dynamical Systems	Fourier Analysis with Applications to Signal Processing & Differential Eqs
Random Graphs	Advanced PDEs	Functional Analysis
Real Analysis	Quantum Computing	Financial Risk
Representation Theory	Stochastic Differential Eqs	Harmonic Analysis
Ring Theory	Theory of Probability	High Performance Computing
Spectral Methods for ODEs & PDEs		Info & Coding Theory
Symmetry Methods for Differential Equations		Intro to Hilbert Spaces
Theory of Probability		Matrix Theory
		Modeling, Simulation & Monte Carlo
		Numerical Linear Algebra
		Neural Networks
		Number Theory
		Optimization Theory & Advanced Topics in Optimization
		Queuing Theory
		Quantum Computing
		Stochastic Processes
		Statistical Methods & data Analysis
		Theory of Probability
		Time Series Analysis & Markov Processes
		Wavelet Analysis

## PRE-REQUISITES, ELECTIVES & AREA OF SPECIALIZATION

Semester 1	Core Courses	Discrete Mathematics and Algebra	Pure/ Applied/ Computational
		Analysis I	
		Geometry and Topology	
		Differential Equations/Analysis II	
Semester 2	Discrete Mathematics and Algebra	Adv. Topics in Algebra	Pure
		Combinatorics	Pure
		Adv. Topics in Combinatorics	Pure/ Computational
		Theory of Numbers	Pure/ Computational
		Graph theory	Pure/ Applied
		Modern Algebra	Pure
		Random Graphs	Pure

		Commutative algebra & algebraic geometry	Pure/ Computational
		Fuzzy Algebra/ Fuzzy Logic	Pure/ Applied/ Computational
		Representation Theory	Pure
		Discrete Applied Mathematic	Applied/ Computational
		Stochastic Process	Pure/Computational
		Advance topics in Stochastic Process	Pure/Computational
		Numerical Linear Algebra	Computational
		Optimization theory and Advance topics in Optimization	Computational
		Finance Theory and Asset Pricing	Applied/ Computational
		Financial Risk	Computational
	Analysis I/Analysis II	Complex Analysis	Pure/ Computational
		High Performance Computing	Computational
		Wavelet Analysis	Computational
		Computational Electromagnetics	Applied/Computational
		Artificial Neural Networks	Computational
		Information and Coding Theory	Applied/ Computational
		Econometrics	Computational
		Actuarial Methods	Computational
		Modeling, Simulation and Monte Carlo	Computational
		Real Analysis	Pure
		Numerical Analysis	Pure/ Applied
		Computational Sciences and Numerical analysis	Applied/ Computational
		Intro. To Hilbert Spaces	Computational
		Intro. To Operator Theory	Pure
		Fixed Point Theory	Applied
		Harmonic Analysis	Computational
		Neural Networks	Computational
		Cryptography	Computational
		Computational Methods	Applied/ Computational
		Matrix Theory	Computational
		Number Theory	Computational
		Computational Complexity and	Computational

		Approximation	
		Functions of a Complex Variable	
		Fourier Analysis with Applications to Signal Processing and Differential Equations	Applied/ Computational
		Computational Fluid Dynamics	Applied/ Computational
		Theory of Probability	Pure/ Applied/Computation
		Time series analysis & markov processes	Computation
		Stochastic Process	Pure/Computational
		Cosmology	Applied
		Convex Analysis	Applied
		Continuum Mechanics	Applied
		Elasticity	Applied
		Magnetohydrodynamics	Applied
		Electrodynamics	Applied
		Computational Biology	Applied/ Computational
		Statistical Methods and Data Analysis	Computational
		Data Mining	Computational
		Detection and Estimation	Applied/ Computational
		Computational Mechanics	Pure/ Computational
		Advance topics in Stochastic Process	Pure/Computational
	Geometry and Topology	Differential Geometry	Pure
		Ergodic Theory & Dynamical Systems	Pure/ Applied
		Adv. Topics in Topology	Pure/ Computational
		Logic	Pure
		Computational Geometry	Computational
		Functional Analysis	Pure/ Computational
		Neural Networks	Computational
		Ring theory	Pure

		Queuing Theory	Computational
		Applied Topology	Computational
		Banach Lattices	Pure/ Computational
		Quantum Computing	Applied/ Computational
	Advanced Differential Equations	Ordinary Differential Equations	Pure
		Partial Differential Equations	Pure/ Applied
		Symmetry methods for differential equations	Pure
		Spectral methods for ODEs and PDEs	Pure
		Nonlinear Differential Equations and Dynamical Systems	Pure/Applied
		Applied diff equation	Applied
		Stochastic diff equation	Applied
		Financial derivatives	Pure
Semester 3	Core for all	Thesis	
Semester 4	Core for all	Thesis	

## COURSE OUTLINES

### Core Courses

#### Discrete Mathematics:

Course Outlines: Introduction to graph theory, Euler trails, Mathematical induction, Euler's formula for planar graphs, The Five-Colour Map Theorem. 2, Recurrence relations, General solution to the second order homogeneous recurrence relation. Fibonacci numbers, Hamilton paths and Gray codes. Introduction to coding theory, Hamming codes, Equivalence relations, Graph isomorphism, Linear codes, abelian groups, cosets. Partial ordering relations, Isomorphism of posets, Sets, relations and functions. Enumerative problems, Applications of binomial coefficients. The Inclusion-Exclusion Formula, Stirling numbers, Classical number theory, The Euclidian algorithm and its complexity. Logic. Half adder and full adder. Boolean lattices.

Discrete algebras include: boolean algebra used in logic gates and programming; relational algebra used in databases; discrete and finite versions of groups, rings and fields are important in algebraic coding theory; discrete semigroups and monoids appear in the theory of formal languages.

#### Analysis (Any analysis course)

##### 1. Multivariable analysis

Course Outlines: Geometry of  $R^n$ : dot product, length, angle, and Schwartz's inequality. Motion in  $R^3$ , velocity and acceleration, curvature and torsion. Differential calculus in  $R^n$ : directional derivatives, Jacobean matrix, chain rule, and higher order partial derivatives. Del operator: gradient, divergence, curl, and Laplacian. Conservative vector fields and independence of path. Streamlines and equipotentials. Green's Theorem, Stokes' Theorem, and Divergence Theorem. Applications to fluid dynamics.

##### 2. Complex Analysis

Course Outlines: Complex numbers, Analytic functions and conformal mappings, Complex line integral, Cauchy's theorem and Cauchy integral formula, Laurent series, Calculus of residues and contour integration, Applications to fluid dynamics.

3. Additional applications: Steady state heat flow, Electromagnetism, Fourier and Laplace transforms, Z-transform.

### **Geometry and Topology**

Course Outlines: topology, topological spaces and continuous functions, connectedness, compactness, separation axioms, and selected further topics such as function spaces, metrization theorems, embedding theorems and the fundamental group. Classification of surfaces. Diffeomorphism groups of surfaces and mapping class groups. Piecewise linear topology (a quick overview). Milnor's theory of microbundles. Smoothings and triangulations of manifolds. Prime decomposition of 3-manifolds. The loop and sphere theorems. Seifert-fibered 3-manifolds. Incompressible surfaces and Haken manifolds. Hyperbolic 3-manifolds and Mostow rigidity.

### **Advanced Differential Equations**

Course Outlines: First order ordinary differential equations (ODEs), higher order ODEs, systems of ODEs, series solutions of ODEs, interpretation of solutions, Fourier analysis and solution of linear partial differential equations using the method of separation of variables.

### **Electives: PURE MATHEMATICS**

#### **Advance topics in Algebra:**

Recommended Books: Abstract Algebra, by David S. Dummit and Richard M. Foote, John Wiley & Sons Inc., 3rd Edition, ISBN: 978-0-471-43334-7

Course Outlines: Sets and Integers, Definitions and examples, Homomorphisms and isomorphisms, Group actions, Definitions and examples, Cyclic groups and subgroups, Subgroups generated by subsets, Lagrange's Theorem, Isomorphism Theorems, Cayley's Theorem, The Class Equation, Sylow's Theorems

#### **Advance topics in Stochastic:**

**Recommended books:** Applied Statistics for Engineers and Physical Scientists, Prentice Hall, 3rd edition, 2009, By *Johannes Ledolter* and *Robert V. Hogg* Applied Statistics with R

**Course Outlines:** Overview of the basic concepts in statistics and probability Tests based on normal distribution, Tests of characteristics of a single distribution; Tests of characteristics of two distributions Tests based on Student's t-distribution, Tests of characteristics of a single distribution; Tests of characteristics of two distributions, Tests of characteristics of two distributions; Certain chi-square tests, Certain chi-square tests; Simple linear regression model, Simple linear regression model, linear correlation; Inferences in the regression model and correlation, More on correlation and Inferences, Adequacy of the fitted model; Multiple linear regression, Multiple linear regression, Multiple linear regression; More on multiple regression, Tests based on F-Distribution, Inferences on variance, Analysis of variance, One-way classification, Two-way classifications, analysis of covariance, Experimental designs, Completely randomized design, Randomized complete block designs.

#### **Advance topology:**

Recommended Books: Greenberg, M.J., Algebraic topology, A first course, The Benjamin/Comings Publishing Company, 1967. Wallace, A.H., Algebraic topology, Homology and cohomology, W.A. Benjamin, Inc., New York, 1968. Gemignani, M.C., Elementary Topology, Addison-Wesley Publishing Company, 1972.

Course Outlines: Compactness in metric spaces, limit point compactness, Sequential compactness and their various characterizations, equivalence of different notions of compactness.

Connectedness, various characterizations of connectedness, connectedness and  $T_2$ -spaces, local connectedness, path-connectedness, components. Homotopic maps, homotopic paths, loop spaces, fundamental groups, covering spaces, the lifting theorem, fundamental groups of the circle, torus etc. Chain complexes, notion of homology.

### **Combinatorics:**

Recommended Books: Alan Tucker, Applied Combinatorics (4th Edition, 2002) John Wiley and Sons. R A Brualdi, Introductory Combinatorics (5rd Edition, 2010), Prentice Hall.

Course Outlines: Basic Counting Principles Permutation and Combination, Pigeonhole Principle Simple and Strong Form and Ramsay Numbers, Binomial Coefficients, Pascal formula, Binomial Identities, Inclusion-Exclusion Principle, Rook Polynomials, Derangements, Generating Functions and calculations of their coefficients, Partitions of integers and Decompositions, Recurrence Relations, Young Tableaux.

### **Complex Analysis:**

Recommended Books: Lars V. Ahlfors, Complex Analysis, McGraw-Hill, 1966, Raghavan Narasimhan, Complex Analysis in One Variable, Birkhäuser, 1985.

Course Outline: Introduction, Analytic functions, Elementary functions, Complex integration, Taylor and Laurent series, Residue theorem and applications.

### **Computational Mechanics:**

Course Outlines: Overview of the finite element method in solid mechanics, The Finite Element Method for Static Linear Elasticity, Advanced Element Formulations, The finite element method for dynamic linear elasticity, Finite element method for nonlinear problems, User subroutines in ABAQUS, Interfaces and contact

### **Differential Geometry:**

Recommended Books: R. S. Millman and G. D. Parker, Elements of Differential Geometry, Prentice-Hall, New Jersey, 1977. A. Goetz, Introduction to Differential Geometry, Addison-Wesley, 1970. E. Kreyzig, Differential Geometry, Dover, 1991. 4. M. M. Lipschutz, Schaum's Outline of Differential Geometry, McGraw Hill, 1969.

Course Outlines: Introduction, index notation and summation convention. Space curves, arc length, tangent, normal and binormal. Osculating, normal and rectifying planes. Curvature and torsion. The Frenet-Serret theorem. Natural equation of a curve. Involution and evolutes, helices. Fundamental existence theorem of space curves. Coordinate transformation. Tangent plane and surface normal. The first fundamental form and the metric tensor. The second fundamental form. Principal, Gaussian, mean, geodesic and normal curvatures. Gauss and Weingarten equations. Gauss and Codazzi equations. Tensor Analysis: Einstein summation convention. Tensors of different ranks. Contravariant, covariant and mixed tensors. Addition, subtraction, inner and outer products of tensors. Contraction theorem, quotient law. The line element and metric tensor. Christoffel symbols.

### **Dynamical Systems and Ergodic Theory:**

Recommended Books: B. Hasselblatt and A. Katok, Dynamics: A first course. (Cambridge University Press, 2003). M. Brin and G. Stuck, Introduction to Dynamical Systems. (Cambridge University Press, 2002)

Course Outlines: Basic notions: dynamical system, orbits, fixed points and fundamental questions; Basic examples of dynamical systems: circle rotations; the doubling map and expanding maps of the circle; the shift map; the Baker's map; the CAT map hyperbolic toral automorphisms; the Gauss transformation and Continued Fractions; Topological Dynamics: basic metric spaces notions; minimality; topological conjugacy; topological mixing; topological entropy; topological entropy of toral automorphisms; Symbolic Dynamics: Shifts and subshifts spaces; topological Markov chains and their topological dynamical properties; symbolic coding; coding of the CAT map; Ergodic Theory: basic measure theory notions; invariant measures; Poincare' Recurrence; ergodicity; mixing; the Birkhoff Ergodic Theorem; Markov measures; Perron-Frobenius theorem, the ergodic theorem for Markov chains and applications to Internet Search. Time permitting: continuous time dynamical systems and some mathematical billiards; unique ergodicity; Weyl's theorem and applications of recurrence to number theory.

### **Functional Analysis:**

Recommended Books:Elementary Functional Analysis by Barbara D. MacCluer, Springer, 2009, Functional Analysis, Sobolev Spaces and Partial Differential Equations by H. Brezis, Springer, 2011.

Course Outlines: Banach spaces, Hilbert spaces, linear functionals, dual spaces, - bounded linear operators, adjoints, the Hahn-Banach, Baire category, Banach-Steinhaus, open mapping and closed graph theorems. compact operators, the spectral theorem for self-adjoint compact operators, the Fredholm alternative. - the weak/weak\* topologies, topological vector spaces, distributions, Sobolev spaces.

### **Fuzzy logics and Neural Networks:**

Recommended Books:Ross T.J, Fuzzy Logic with Engineering Applications, 2nd Edition, John Wiley & Sons, 2004.Yen J and Langari R, Fuzzy Logic Intelligence, Control, and Information,Pearson, 2009.

Course Outline:Fuzzy set operations, Properties of fuzzy sets, Fuzzy relations, Cardinality of fuzzy relations, Operations on fuzzy relations, Logic, Classical logic, Fuzzy logic, Approximate reasoning, Other forms of the implication operation. Fuzzy systems, Natural language, Linguistic hedges, Fuzzy (rule-based) systems, Graphical techniques of inference, Artificial neural networks, Architects and behaviours, Supervised, Unsupervised and reinforcement learning, Relational equations, Nonlinear simulation using fuzzy systems, Fuzzy associative memories (FAMs), Fuzzy synthetic evaluation, Fuzzy ordering, Non transitive ranking, Preference and consensus, Multi objective decision making, Fuzzy bayesian decision method, Decision making under fuzzy states and fuzzy actions.

### **Graph Theory:**

Recommended Books:Danh T.N, Advanced Discrete Mathematics, VNU of Ho Chi Minh City, 2004.Susanna S. E, Discrete Mathematics with Applications, 3rd Edition, Thomson, 2004.Rosen K.H, Discrete Mathematics and its Application, 5th Edition, Mcgraw Hill Co Inc, 2003.

Course Outline: Basic concepts, Connectivity, Cycles and cut sets, Matrix representation, Introduction to graph colouring, Independent sets and cliques perfect graph, Euclidian paths and circuits, Hamiltonian paths and circuits, Basic concepts, Euler's formula, Kuratowski's theorem, Dual graphs, Shortest paths, Maximum flows, Minimum cost flows, communication networks, Difficult routing and assignment problems, Introduction to trees, Characterizing



trees, Rooted trees, Binary trees, Spanning trees, Minimum spanning trees, Counting spanning trees, Shortage fault, Cycles, Edge cuts, Graph and vector spaces, Matroids and Greedy algorithms, Principle of inclusion and exclusion, Rook polynomials, Hall's theorem, Optimal assignment problems, Introductory coding theory, Linear codes, Hamming codes, Finite state automata.

### **Number Theory:**

Recommended Books:Elementary Number Theory, 2nd Edition, by Charles Vanden Eynden, Waveland Press.

Course Outlines:Euclidean algorithm, gcd, lcm, primes, fundamental theorems of arithmetic, congruences, solving linear congruences, Chinese remainder theorem, higher order congruences, quadratic reciprocity, factorization, primality testing, diophantine equations.

### **Numerical Analysis:**

Recommended Books: Numerical Analysis, by R. Burden and D. Faires, 9th Edition, Brooks/Cole, Cengage Learning, 2011. Numerical Analysis, course-pack, by D. Dryanov, Concordia University, 2013

Course Outline: Introduction: the purpose of Numerical Analysis; a bit of its history. Approximate numbers, absolute and relative error. Two sources of errors, roundoff error (numerical noise) and error of a numerical method. Error behaviour under arithmetic operations. Numeric algorithms, their convergence and stability. Pitfalls of instability. Function computation by the Taylor series and the remainder estimate, Location of solutions of non-linear equations in intervals; Bisectional method; Fixed-point method, Newton-Raphson and Secants Methods, Error analysis for iterative methods, order of convergence, Accelerated convergence – Aitken's method, Steffenson's method, Polynomial interpolation; Lagrange interpolating polynomial; interpolation error. Divided difference and Newton interpolation formula. Interpolation in tables, Interpolation by trigonometric polynomials; discrete Fourier transform. Chebyshev polynomials as projection of trigonometric polynomials. Minimal property of the Chebyshev polynomial and the error estimate of the Chebyshev interpolation, Cubic Spline interpolation, Approximation by trigonometric polynomials: Best continuous least squares approximants; Best discrete least squares approximants. The Legendre and Chebyshev least square approximations, Numerical differentiation and Richardson extrapolation, Euler-McLaurin formula. Quadrature formula on the circle and its error estimate, Newton-Cotes quadrature formulae, error estimate. Composite quadrature formulae, Richardson extrapolation and Romberg integration method. Gaussian quadrature formulae.

### **Partial Differential Equations:**

Recommended Books:Basic Partial Differential Equations by David Bleecker and George Csordas

Course Outline:Introduction: 1st order equations, Heat and diffusion equation, Fourier series, Sturm-Liouville theory, Wave equation, Laplace's equation

### **Real Analysis:**

Recommended Books:Real Analysis, 3rd Edition, by Royden and H.L. MacMillan.

Course Outlines: Set theory, the real number system, Metric spaces, Topological spaces, Compact and locally compact spaces

**Representation Theory:**

Recommended Books: Fulton, Harris, Representation Theory, Serre, Linear Representations of Finite Groups, Curtis, Reiner, Representation Theory of Finite Groups and Associative Algebras, Gabriel, Roiter, Representations of Finite-dimensional Algebras

Course Outlines: Representations of groups, Schur's Lemma. Complete reducibility in case of zero characteristic, Characters and orthogonality relation, Induced representation. Frobenius reciprocity. Mackey's criterion, Representations of associative rings. Density theorem. Semi-simple rings, Wedderburn's theorem. Decomposition of a group algebra, Representations of non-semisimple rings. Blocks. Injective and projective modules, Representations of symmetric groups, Young diagrams and Frobenius formula, Hopf algebra approach, Representations of general linear group, Weyl duality and Schur's polynomials, Complex representations of linear groups over finite fields, Hecke algebra, Compact groups and their representations. Peter-Weyl theorem, Real representations and representations over subfields of  $\mathbb{C}$ . Schur indices, Artin's and Brauer's theorems, Representations of quivers. Definition and examples, Gabriel's theorem, Representations of finite groups over fields of nonzero characteristic

**Ring Theory:**

Recommended Books: Fraleigh, J.A., A First Course in Abstract Algebra, Addison Wesley Publishing Company, 1982. Herstein, I.N., Topics in Algebra, John Wiley & Sons 1975. Lang, S., Algebra, Addison Wesley, 1965. Hartley, B., and Hawkes, T.O., Ring, Modules and Linear Algebra, Chapman and Hall, 1980.

Course Outlines: Definitions and basic concepts, homomorphisms, homomorphism theorems, polynomial rings, unique factorization domain, factorization theory, Euclidean domains, arithmetic in Euclidean domains, extension fields, algebraic and transcendental elements, simple extension, introduction to Galois Theory.

**Symmetry methods for differential equations**

Recommended Books: CRC handbook of Lie group analysis of differential equations, Volume 1: Symmetries, exact solutions and conservation laws by Nail H. Ibragimov (CRC Press). Applications of Lie groups to differential equations by Peter J. Olver (Springer - Verlag). Differential equations: Their solution using symmetries by Hans Stephani (Cambridge University Press)

Course Outline: Ordinary differential equations, Lie point symmetries of ordinary differential equations, How to Use Lie point Symmetries to find exact solutions: Differential equations with one symmetry, How to Use Lie point Symmetries to find exact solutions: Differential equations admitting groups  $G_2$  and  $G_3$ , Applications, Linearization of ODEs, Partial differential equations, First order – fourth order PDEs, Exact solutions of ODEs and PDEs from first integrals/conservation laws.

**Electives: APPLIED MATHEMATICS****Advance PDEs**

Recommended books: Introduction to Partial Differential Equations and Boundary Value Problems by R. Dennymer. Linear Partial Differential Equations for Scientists and Engineers by Tyn Myint-U & Lokenath Debnath. Techniques in Partial Differential Equations by C. R. Chester. Applied Partial Differential Equations with Fourier series and Boundary value Problems by Richard Haberman. Introduction to Partial Differential Equations by Matthew P. Coleman

Course Outlines: Definition of PDE, Solution of PDEs and principle of superposition, Boundary conditions and their types, Homogeneous PDEs with constant coefficient and separation of variables, Holomorphic functions, Classification of second order linear PDEs, The Heat equation and diffusion equation, Wave equation and vibrating string, Initial and boundary conditions for heat and wave equations, Laplace's Equation, Solutions of Heat, wave and Laplace's equations by separation of variables, Fourier transform and properties, Convolution theorem for Fourier transform, Solution of PDEs by Fourier transform, Laplace transform and its properties. Convolution theorem for Laplace transform, Laplace transform of Heaviside unit step and Direct Delta functions, Solutions of partial differential equations by Laplace transform method. Green's function and its properties, Method of Green's function, Nonlinear partial differential equations, Method of characteristics, Solution of nonlinear partial differential equations by method of characteristics

### **Applied ODE:**

Recommended Books: Advanced Engineering Mathematics, by Dennis G. Zill and Warren S. Wright, 5th Edition, Published by Jones and Bartlett, 2014.

Course Outline: Definition and Terminology, Initial Value Problems, Separable Equations, Linear Equations, Exact Equations, Solutions by Substitution, Linear Models (Growth and Decay, Newton's Law of Cooling), Complex Numbers, Powers and Roots, Theory of Linear Equations, Homogeneous Linear Equations with Constant Coefficients, Undetermined Coefficients, Variation of Parameters, Cauchy Euler Equations, Nonlinear Equations, Reduction of Order, Linear Models. Initial Value Problems, Linear Models. Boundary Value Problems, Review of Power Series, Power Series Solutions, Theory of Linear Systems, Homogeneous Linear Systems, Solution by Digitalization, Non-Homogeneous Linear Systems, Matrix Exponential

### **Computational Fluid Dynamics:**

Recommended Books: Wendt J.F, Computational Fluid Dynamics, 3rd Edition, Springer, 2009. Versteeg H and Malasekera W, An Introduction to Computational Fluid Dynamics, Dorling Kindersley, 2008. Hirsch C, Numerical and Computation of internal and external flows, A Butterworth-Heinemann, 2007. Pozrikidis C, Introduction to Theoretical and Computational Fluid Dynamic, Oxford University Press, 1997.

Course Outlines: Introduction and Governing Equations in CFD, Governing equations of fluid dynamics in differential and integral form with fixed and moving control volume, physical interpretation of terms involved in the governing equation, Mathematical behaviour of the PDE and its suitability for different types of flows, Basic schemes of discretisation, Finite difference method, Finite element method, Finite volume method, Boundary element method, merits and demerits of each method, Initial and boundary conditions (symmetry, inlet, outlet, open boundary condition, wall, cyclic boundary conditions) and its mathematical description for steady and unsteady flows, incompressible flows, compressible flows, subsonic and supersonic flows, Segregated versus coupled solver methods, residuals and imbalances, Accuracy of numerical schemes, Types of Errors, false diffusion, stability criterion, relaxation methods, Grid Independent study, Introduction of turbulence, Turbulence transport equations, Turbulence models based on Reynolds Average Navier-Stokes equation (RANS), application of different turbulence models, Hands on experience with commercial CFD packages.

### **Detection and Estimation Theory:**

Recommended Books: H. V. Poor, "An introduction to signal detection and estimation", Springer, 1994 . H. L. Van Trees, "Detection, estimation, and modulation theory," Wiley-Interscience, reprinted in 2001

Course Outlines: Hypothesis Testing: Optimal fixed sample and sequential tests, performance analysis, applications to signal detection, demodulation, etc. Parameter Estimation: Sufficient statistics, Cramer-Rao lower bound, maximum-likelihood estimates, asymptotic performance analysis, signal parameter estimation and applications. Time series: Estimation of stationary processes (Wiener filtering), recursive estimators (RLS, LMS, Kalman filtering). Topics for Course Project: Expectation-maximization (EM) algorithm, compressed sensing for hypothesis testing, signal classification, etc.

### **Elasticity:**

Recommended books: Sokolnikoff, Mathematical theory of Elasticity, McGraw-Hill, New York. Dieulesaint, E. and Royer, D., Elastic Waves in Solids, John Wiley and Sons, New York, 1980. Funk, Y.C., Foundations of Solid Mechanics, Prentice-Hall, Englewood Cliffs, 1965.

Course Outlines: Cartesian tensors; analysis of stress and strain, generalized Hooke's law; crystalline structure, point groups of crystals, reduction in the number of elastic moduli due to crystal symmetry; equations of equilibrium; boundary conditions, compatibility equations; plane stress and plane strain problems; two dimensional problems in rectangular and polar coordinates; torsion of rods and beams.

### **Electromagnetism:**

Recommended books: Reitz, J.R. and Milford, F.J., Foundation of electromagnetic theory, Addison-Wesley, 1969. Panofsky, K.H. and Philips, M., Classical Electricity and Magnetism, Addison-Wesley, 1962. Corson, D. and Lerrain, P., Introduction to Electromagnetic fields and waves, Freeman, 1962. Jackson, D.W., Classical Electrodynamics, John-Wiley. Ferraro, V.C.A., Electromagnetic theory, The Athlone Press, 1968.

Course Outlines: Electrostatics and the solution of electrostatic problems in vacuum and in media, Electrostatic energy, Electric currents, the magnetic field of steady currents, and Magnetic properties of matter. Magnetic energy, Electromagnetic Induction, Maxwell's equations, Boundary Value Potential Problems in two dimensions, Electromagnetic Waves, Radiation, Motion of electric charges.

### **Fixed Point Theory**

Course Outlines: Basic concepts: metric spaces, complete metric spaces, Vector spaces (linear spaces) normed spaces. Banach spaces, Banach's contraction principle, non-expansive mappings and related fixed point theorems. Contractive maps, properties of fixed points set and minimal sets. Multivalued mappings and related fixed point theorems. Best approximation theorems.

### **Magneto Hydrodynamics:**

Course Outlines: A brief History of MHD, Some important parameters in electrodynamics & MHD, A brief reminder of the laws of electrodynamics, The Governing equations of Electrodynamics. The electric field & the Lorentz Force, Ohm's Law, Ampere's law, Faraday's Law in different forms, The Reduced form of Maxwell's equations for MHD, A Transport equation for Magnetic field. Different categories of fluid flow, The Navier-Stokes equation, Vorticity, Angular Momentum & the Biot-Savart Law, Advection & Diffusion of Vorticity, Kelvin's Theorem, Helmholtz's Laws & Helicity, The Prandtl-Batchelor Theorem, Boundary Layers, Reynolds Stresses & Turbulence Models, Ekman Pumping in Rotating Flows. The full Equations of MHD & Key Dimensionless Groups, Maxwell Stresses, The Analogy to Vorticity,

Diffusion of a Magnetic Field, Advection in Ideal Conductors: Alfven's Theorem, Magnetic Helicity, Advection and Diffusion, Dynamics at Low Magnetic Reynolds Numbers, Magnetic Damping, A Glimpse at MHD Turbulence, Natural Convection in Presence of a Magnetic Field, Rotating Fields & Swirling Motions, Motion Driven by Current Injection, Hartmann Boundary Layers, Examples of Hartmann & Related Flows, Alfven Waves & Magneto strophic Waves, Elements of Geo-Dynamo Theory, A Qualitative Discussion of Solar MHD, Energy-Based Stability Theorems for Ideal MHD, A Survey of Conventional Turbulence, MHD Turbulence, Two-Dimensional Turbulence, Axi-symmetric Flow Driven by Injection of Current, The VAR Process & a Model problem, The work done by Lorentz Force, Structure & Scaling of the Flow, The Influence of Boundary, Stability of the Flow & the Apparent Growth of Swirl, Flaws in the Traditional Explanation for the Emergence of Swirl, The Role of Ekman Pumping in Establishing the Dominance of Swirl.

## **Electives: COMPUTATIONAL MATHEMATICS**

### **Adv. Topics in Combinatorics (Probabilistic methods)**

Course Outlines: The Basic Method - Examples from graph theory, combinatorics, and number theory of the use of the probabilistic method; the use of linearity of expectation. The Second Moment Method - The use of Markov and Chebyshev inequalities; examples from number theory and random graphs. The Lovasz Local Lemma - Applications in graph theory and computer science. Correlation Inequalities - The four functions theorem; FKG and XYZ inequalities. The Poisson Paradigm - Examples from random graphs; the use of martingales; Azuma's inequality, Telagrand's inequality; chromatic number of random graphs. Alterations - Ramsey numbers; packing and recoloring; the Rodl nibble (or the semi-random method). Random Graphs - Clique number; chromatic number; branching processes; zero-one laws. Combinatorial Discrepancy Theory - Balancing lights; Spencer's six standard deviations result; Beck-Fiala theorem and the Komlos conjecture; linear and hereditary discrepancy. Derandomization - Conditional probabilities; limited independence of random variables. Optional Material. Combinatorial Geometry - Epsilon-nets and VC-dimension; additional topics. Codes and Games - Balancing vector game; coin-weighing problems

### **Adv. Topics in Stochastic Processes**

Course Outlines: Selected topics in stochastic processes, including Markov and Wiener processes; stochastic integrals, optimization, and control; optimal filtering.

### **Artificial Neural Networks**

Course Outlines: Mathematical Model of Neural Networks, Artificial Neural Network Learning Methods and Learning Strategies, Selecting appropriate Neural Network Topology, Activation Functions, Using neural networks for classification and pattern recognition, Prediction variables and indicators, Prediction variables and indicators

### **Applied Topology**

Course Outlines: Useful topological spaces: manifolds; simplicial complexes; Overview of tools of algebraic topology: homotopy equivalence, homologies (singular); elements of de Rham and Hodge theorems. Bjorner-Lovasz-Yao theory on lower bounds of decision trees. Definable sets, constructible functions and Integrals with respect to Euler characteristic and applications Alexander duality and applications (caging in robotics) Topological data analysis: shape of data, persistence, cyclicity Classical configuration spaces; their cohomologies, Arnold-Brieskorn relations. Configuration spaces on graphs; hard disk configuration spaces, Spaces of directed paths, their topology and applications

### **Actuarial Methods**

Course Outlines: The economics of insurance, the future lifetime random variables (discrete and continuous), force of mortality, Life Tables: Select, Ultimate and Select and Ultimate, Annuities and Assurance in both discrete and continuous case, Commutation Functions.

### **Banach Lattices**

Course Outlines: Properties of finite and infinite dimensional Banach spaces, Tensor norms and local property of Banach spaces, Trace duality and certain norms on spaces of linear maps, Grothendieck's approximation property for Banach spaces, Type and cotype, application of probabilistic techniques in Banach spaces, Grothendieck's inequality, An introduction to operator spaces (, i.e. a natural quantization of Banach spaces).

### **Cryptography**

Course Outlines: History and overview of cryptography, One time pad and stream ciphers, Block ciphers, Block cipher abstractions: PRPs and PRFs, Attacks on block ciphers, Message integrity, Public key cryptography, Digital signatures, Identification protocols, Authenticated key exchange and SSL/TLS session setup, Zero knowledge protocols, Advanced topics. TBD

### **Computational Methods**

Course Outlines: Root finding and non-linear systems. Systems of linear equations. Curve fitting and interpolation. Numerical integration and differentiation. Numerical solution of Ordinary Differential Equations. Numerical solution of Partial Differential Equations.

### **Computational Fluid Dynamics**

Course Outlines: Introduction to the methods and analysis techniques used in computational solutions of fluid mechanics and heat transfer problems. Model problems are used to study the interaction of physical processes and numerical techniques. Contemporary methods for boundary layers, incompressible viscous flows, and inviscid compressible flows are studied. Finite differences and finite volume techniques are emphasized.

### **Computational Sciences & Numerical Analysis**

Course Outlines: Introduction, Linear Least Squares, Eigenvalues and Singular Values, Nonlinear Equations, Optimization, Interpolation, Numerical Integration and Differentiation

### **Commutative Algebra & Algebraic Geometry**

Course Outlines: Preliminaries. Algebraic Sets. Affine Algebraic Varieties. Algebraic Varieties. Local Study. Projective Varieties. Complete Varieties. Finite Maps. Dimension Theory

### **Computational Electromagnetics**

Course Outlines: Intro to CEM; Numerical integration; Iterative and direct solvers; Finite difference method; Integral equation methods - Method of Moments; Finite element method. Computational Complexity & Approximate Functions of a Complex Variable Models of computation, Languages, Undecidability, Non-determinism, Probabilistic Algorithms, Complex Classes

### **Computational Biology**

Course Outlines: Biological sequence analysis, gene identification, regulatory motif discovery, genome assembly, genome duplication and rearrangements, evolutionary theory, clustering algorithms, and scale-free networks.

### **Computational Mechanics**

Course Outlines: Linear and non-linear continuum mechanics, phenomenological materials theory, structural mechanics, materials science and homogenization procedures; Numerical discretization and solution methods of mechanics, finite element methods, optimization processes and program development; Materials science, metrology and parameter identification of material models; Computer-assisted simulation in all areas of engineering science and engineering practice.

### **Computational Geometry**

Course Outlines: Getting started with PostScript, Signed area/volume calculations and related predicates, Polygon triangulation, 2-d convex hulls, 3-d convex hulls, Voronoi diagrams, Arrangements, More significant predicates, Motion planning

### **Discrete Applied Mathematics**

Course Outlines: Probability, counting, linear programming, number-theoretic algorithms, sorting, data compression, and error-correcting codes.

### **Data Mining**

Course Outlines: Introduction, Data warehouses, Data preparation and integration Graphic representation, Decision trees, Association rules, Bayesian networks, Clustering, Model Evaluation

### **Econometrics**

Course Outlines: Statistical inference, regression, generalized least squares, instrumental variables, simultaneous equations models, and evaluation of government policies and programs.

### **Fuzzy Algebra**

Course Outlines: **Fuzzy Sets: Basics, Operations on Fuzzy Sets, Fuzzy Relations, Possibility Theory, Approximate Reasoning and Fuzzy Controllers**

### **Finance Theory & Asset Pricing**

Course Outlines: No-arbitrage, Arrow Debreu prices, and equivalent martingale measures, security structure and market completeness, mean-variance analysis, Beta pricing, CAPM, and derivatives pricing.

### **Fourier analysis**

Course Outlines: Introduction to harmonic analysis and Fourier analysis methods, such as Calderon-Zygmund theory, Littlewood-Paley theory, and the theory of various function spaces, in particular Sobolev spaces. Applications to ergodic theory, complex analysis, and geometric measure theory

### **Functional Analysis**

Course Outlines: Norms, bounded linear operators, completeness. Step functions, covering lemma, Lebesgue integrable functions. Fatou's lemma, dominated convergence, L1. Cauchy's inequality, Bessel's inequality, orthonormal bases. Convex sets, minimization, Riesz' theorem, adjoints. Compact sets, weak convergence, Baire's theorem, uniform boundeness. Finite rank and compact operators. Spectral theorem for compact self-adjoint operators. Fourier series, periodic functions. Dirichlet problem on the interval, completeness of eigenfunctions

### **Financial Risk**

Course Outlines: U.S. 2007-9 Financial Crisis & Risk; Market Efficiency & Behavioral Finance Econometrics Review Definitions of risk Demand estimation for insurance/risk

management, and financial services Risk management introduction, Comparative advantage in risk management Sources of risk. Risk management strategy examples Risk and utility. Moral hazard and Adverse Selection. Portfolio theory and risk management, Capital Market Theory, Cost of risk to firms. Benefits of risk reduction, Measuring risk on financial statements, Implementing a risk management program, Derivatives: futures, options, forward contracts, hedging, swaps Value at Risk (VAR) Application; Estimating Volatility (GARCH and EMA models) Regulation and Value at Risk (VAR): Basel Accord Credit Risk: Counterparty Risk, Bankruptcy Risk, Credit Scoring and Lending, Bond Rating Portfolio Optimization for investment Simulation and Option Pricing Model

### **Harmonic Analysis**

Course Outlines: Basic material concerning Fourier series, Fourier transform and Fourier inversion, Convergence of Fourier series, Interpolation of operators, Singular integral operators, Littlewood-Paley theory

### **High Performance Computing**

Course Outlines: Computational Science and Engineering Applications; characteristics and requirements, Review of Computational Complexity, Performance: metrics and measurements, Granularity and Partitioning, Locality: temporal/spatial/stream/kernel, Basic methods for parallel programming, Real-world case studies (drawn from multi-scale, multi-discipline applications)

Memory Hierarchies, Multi-core Processors: Homogeneous and Heterogeneous, Shared-memory Symmetric Multiprocessors, Vector Computers, Distributed Memory Computers, Supercomputers and Petascale Systems, Application Accelerators / Reconfigurable Computing 8. Novel computers: Stream, multithreaded, and purpose-built

Parallel models: ideal and real frameworks, Basic Techniques: Balanced Trees, Pointer Jumping, Divide and Conquer, Partitioning, Regular Algorithms: Matrix operations and Linear Algebra, Irregular Algorithms: Lists, Trees, Graphs, Randomization: Parallel Pseudo-Random Number Generators, Sorting, Monte Carlo techniques Revealing concurrency in applications, Task and Functional Parallelism, Task Scheduling, Synchronization Methods , Parallel Primitives (collective operations), SPMD Programming (threads, OpenMP, MPI) , I/O and File Systems ,Parallel Matlabs (Parallel Matlab, Star-P, Matlab MPI), Partitioning Global Address Space (PGAS) languages (UPC, Titanium, Global Arrays) Measuring performance, Identifying performance bottlenecks, Restructuring applications for deep memory hierarchies, Partitioning applications for heterogeneous resources , using existing libraries, tools, and frameworks

### **Info & Coding Theory**

Course Outlines: Review of probability theory. Entropy. Mutual information. Data compression. Huffman coding. Asymptotic equipartition property. Universal source coding. Channel capacity. Differential entropy. Block codes and Convolutional codes.

### **Intro to Hilbert Spaces**

Course Outlines: Vector spaces, dot products, norms, Cauchy-Schwartz inequality. Contrast the geometry of  $\mathbb{R}^n$ ,  $\mathbb{R}^\infty$ ,  $l^2$ ,  $L^2(\mathbb{R})$ , and other spaces. Complete orthonormal sequences, Fourier series, Bessel's and Parseval's inequality. Projections: closest point projections, linear projections, non-expansive projections, orthogonal projections, and self-adjoint projections. Bounded linear functions, Riesz representation theorem, and the Lax-Milgram theorem. Characterizations of finite dimensional and of self-adjoint, normal, compact, or closed linear operators. A structure for unbounded linear operators, Sturm-Liouville operators. Contraction Mapping Theorem and applications. Various topics depending on the interest of the instructor: Fredholm Alternative Theorems, control problems, ordinary or partial



differential equations, semigroups of operators, generalized inverses, reproducing kernel Hilbert spaces, etc. Normed and Sobolev spaces

### **Matrix Theory**

Course Outlines: Systems of Linear Equations and Matrices. Determinants. Euclidean Vector Spaces. General Vector Spaces. Eigenvalues and Eigenvectors, Diagonalization. General Linear Transformations, Kernel, Range. Application to Differential Equations, LU-decomposition, Graph Theory, Cryptography.

### **Numerical Linear Algebra**

Course Outlines: Single value decomposition, Least Square problems and QR factorization, Conditioning & stability, Direct methods for solving linear systems, Eigen Value problems and QR algorithm, Intro to iterative method

### **Optimization Theory**

Course Outlines: Introduction to optimization. Gradient-based optimization. Unconstrained function minimization. Constrained function minimization. Multidisciplinary design optimization. Structural optimization. Applications of optimization

### **Queuing Theory**

Course Outlines: Birth-death processes and simple Markovian queues, networks of queues and product form networks, single and multi-server queues, multi-class queuing networks, fluid models, adversarial queuing networks, heavy-traffic theory and diffusion approximations.

### **Quantum Computing**

Course Outlines: Physics of information processing, quantum logic, quantum algorithms including Shor's factoring algorithm and Grover's search algorithm, quantum error correction, quantum communication, and cryptography.

### **Theory of Probability**

Course Outlines: Sums of independent random variables, central limit phenomena, infinitely divisible laws, Levy processes, Brownian motion, conditioning, and martingales.

### **Time Series Analysis & Markov Processes**

Course Outlines: Stochastic processes: The modules cover the general theory underlying stochastic processes and their classifications, definitions and applications of discrete Markov chains. Branching processes. Counting processes in discrete and continuous time are modelled with a view to establishing methods of forecast and backcast. Ruin theory and reinsurance themes are insurance of continuous time processes. Ruin and loss are considered in a framework covering single claims for losses or insured events. Time series analysis: global and local models of dependence, stationary ARMA processes, unit root processes, brief introduction to univariate Volatility models as well as cointegration.

### **Wavelet Analysis**

Course Outlines: Filter Banks and Multi resolution Analysis, Wavelet Theory (Time-Scale Analysis), Variations over a Theme, Extensions, Data compression, signal denoising, feature extraction/detection. Signal and image processing basics. Data hiding. Multiscale methods for partial differential equations and integral equations. Compressed sensing (e.g. wavelet-domain compressive signal reconstruction), fMRI application. Wavelet applications in data mining.

## MS in Applied Mathematics, new launch Proposal

### The Case

1. Mathematics has always been crucial to many forms of scientific inquiry. Now, more than ever, advances in scientific research are found to benefit from the formulation and analysis of quantitative mathematical models. Successful analysis of a model leads to a better understanding of the role and interaction of key components in the system being studied and provides a predictive tool for improving system performance.
2. The Master's Degree Program in Applied Mathematics is specially designed to prepare graduates for a successful career in today's industrial/business and educational world. This research based program is aimed to improve analytical and problem solving skills of the students besides their capacity enhancement.
3. Therefore, it is imperative to launch this discipline which will surely add laurel to the university and it will also benefit the public in a way that desirous students will get quality education.

### HR/Establishment Effect

4. One additional regular faculty with Ph.D (Mathematics)
5. One Visiting Faculty with MS/Ph.D (Mathematics)

### Financial Effect

Attached below

### Conclusion

6. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. Point was debated in the house in length. A committee was also formed by BUHQ for further discussion and deliberation on the issues with regard to curriculum, faculty and prospective students for the program.

### Recommendation(s) to the Academic Council

7. The proposal to launch the new MS program in Applied Mathematics may be approved in the light of the house's opinion.

### Annexure

Proforma for Starting New Academic Programme

### MS-Applied Mathematics to be launched from Fall-2016

A. ACADEMIC DETAILS	
(1)	<b>Faculty / Institute / Department:</b> Department of Humanities & Natural Sciences (H&NS) Bahria University, Karachi Campus (BUKC)
(2)	<b>Name of the Program:</b> Master in Science (MS)- Applied Mathematics
(3)	<b>Duration:</b> 4 Semesters (2 years degree program)
(4)	<b>Venue (s)</b> The Department of Humanities & Natural Sciences (H&NS), BUKC.

(5)	<p><b>Whether the proposed program will be offered in (morning/evening/weekend)?</b></p> <p>At H&amp;NS, BUKC in evening shift after 6:00 p.m, during Monday - Friday</p>
(6)	<p><b>Number of <u>Extra</u> Faculty Member(s) or Skilled-Worker(s) Required?</b></p> <p>(Write the faculty members and skilled-workers, fulltime/Visiting, required in <u>addition</u> to the existing strength, along with their qualifications)</p> <ul style="list-style-type: none"> <li>➤ One fulltime P.hD (Mathematics) Faculty required.</li> <li>➤ One Visiting Faculty MS/P.hD (Mathematics).</li> </ul>
(7)	<p><b>Any <u>extra</u> class room(s) required? If yes, how many? And what will be their capacities required?(provide details)</b> No – Present classrooms are sufficient enough..</p>
(8)	<p><b>Any <u>extra</u> laboratory/laboratories required? If yes, how many? And what <u>additionalequipment</u> will be required?(provide details of equipment, use extra sheet if necessary)</b></p> <p>One existing computing lab equipped with all the relevant software will be used for new degree program of MS Applied Mathematics.</p>
(9)	<p><b>Minimum Entry Level:</b></p> <ul style="list-style-type: none"> <li>• 16 years of education from HEC recognized educational universities/ institutes, students with Mathematical Background.</li> <li>• CGPA 2.50 or above in the final degree, on hand, if degree obtained from a CGPA based system.</li> <li>• Minimum 50% marks if degree obtained from a non-CGPA program.</li> <li>• Must pass Bahria University Admission Test.</li> </ul> <p style="text-align: center;">Or</p> <ul style="list-style-type: none"> <li>• GAT General with 50 marks obtained in less than two years prior to admissions. (policies of HEC shall apply as amended from time to time)</li> </ul>
(10)	<p><b>Admission Criteria:</b> As per BU Policy</p>
(11)	<p><b>Proposed Date of Commencement:</b> From Fall-2016</p>
(12)	<p><b>Mode of Study / Examination:</b> (Semester / Annual / Bi-Annual)</p> <ul style="list-style-type: none"> <li>• Semester System (Two semester per year)-Fall and Spring</li> </ul>
(13)	<p><b>Brief Description &amp; Rationale of the Program:</b></p> <p>(Attach separate sheet, if necessary)</p> <ul style="list-style-type: none"> <li>• Department of Humanities &amp; Natural Sciences (H&amp;NS) Karachi Campus is newly establish department. The degree program of MS in Applied Mathematics is intended to launch from Fall-2016.</li> <li>• The complete draft of the program is attached to be forwarded to HEC for necessary approval.</li> <li>• The program is designed to enhance research &amp; professional skills among the mathematicians of the country.</li> <li>• It has been planned to offer this program in the evening for the convenience of students.</li> </ul>
(14)	<p><b>Complete Plan of Studies</b></p> <ul style="list-style-type: none"> <li>• Department of Humanities &amp; Natural Sciences (H&amp;NS) Karachi Campus will follow the approved Road Map of MS Applied Mathematics. (Attach complete roadmap with semester wise breakup)-attached</li> </ul>
(15)	<p><b>Course Outlines</b></p> <ul style="list-style-type: none"> <li>• Detailed course description for each course is attached</li> </ul>
(16)	<p><b>Examination Policy</b></p> <ul style="list-style-type: none"> <li>• Will follow the examination Policy of Bahria University</li> </ul>
(17)	<p><b>Number of Admissions Expected for First Intake:</b></p> <ul style="list-style-type: none"> <li>• It is expected 6 to 8 students may be enrolled in 1<sup>st</sup> semester in this program.</li> </ul>

(18)	<b>Number of Admissions Planned/Expected for Subsequent Intakes:</b> <ul style="list-style-type: none"> <li>10 % increase every semester</li> </ul>
(19)	<b>Date of Approval by the Board of Study?</b> <ul style="list-style-type: none"> <li>Next ACM, to be held during this year (2016)</li> </ul>

#### B. FINANCIAL ANALYSIS

(1)	<b>Any Agency (Public/Private) Funding this Program (Fully/Partially)?</b> Nil
(2)	<b>Expected Earning from First Intake:</b> Rupees 0.2 million per semester.
(3)	<b>Projected Earnings for the Next Five Years:</b> 10% to 15% (per semester)
(4)	<b>Total Estimated Salaries of all Extra Human Resources per Annum:</b> Rupees 1.5 million
(5)	<b>Cost of <u>Extra</u> Laboratory Equipments/Tools (if required):</b> Nil (initially no requirement)
(6)	<b>Cost of <u>Extra</u> Books for the Library: (if required):</b> Nil
(7)	<b>If the Venue is Hired, provide Annual Rental Expenses and Cost of other Fixtures:</b> Nil
(8)	<b>Miscellaneous Expenses Required for Starting the Program:</b> (Write all expenses required for Furniture, Marketing, Advertisements, Prospectus-Printing etc.) <ul style="list-style-type: none"> <li>Approximately Rupees 0.1 million per year for maintenance and upgrading classroom/lab.</li> </ul>
(9)	<b>Total Annual Recurring Expenditures Required in Subsequent Years: (like Salaries, Advertisements, Stationeries etc)</b> Rupees 0.25 millions

#### C. PROGRAMME VIABILITY

(1)	<b>Total Expenditures Required: Add B(4) to B(8)</b> Rupees 1.6 million
(2)	<b>Net Expenditures Required: Subtract B(1) from C(1)</b> Rupees 1.6 million
	<b>Net Earnings in First Year: Subtract C(2) from B(2)</b> No net earnings (a debit of Rupees 1.4 million)
(4)	<b>Projected Annual Gross Earning in Subsequent Years:</b> 1 <sup>st</sup> years (three semesters) = Rupees 0.6 million (+0.2 million rupees per annum, may differ with intake)
(5)	<b>Projected Annual Net Earning in Subsequent Years for five years: Rs. 1 million (Approximately) Subtract B(9) from C(4)</b> The program shall become profitable in coming years.

## Launch of BS (Int Relations & Development Studies) from Fall 2016

### The Case

1. Many of the students and parents are confused regarding the nature of BSS program at BUIC. In order to clarify the programmes at H&SS department, it is important to induct students in separate programs from the 1st semester instead of declaring their programs till 3rd semester.
2. The students of all programs would be taking courses collectively for the first three semesters as the road maps for the said semesters for all programs are same.
3. Students would have choice to change their programs within first two weeks of the start of semester. However, department will not be responsible for short attendance of such cases. Detailed Roadmaps are attached at Annexure.
4. There was consensus amongst members of the DBOS that the BS programs at H&SS department be started from the first semester. Therefore, it is highly desired that the BS in IR and Development Studies must be started in H&SS department of BUIC.
5. It is important to separate programs from the first semester in order to avoid confusion.
6. Permission to start BS programs be granted please

### Annexure

#### **BS DEVELOPMENT STUDIES ROAD MAP**

#### **Roadmap For First Three Semesters**

#### **SEMESTER ONE**

<b>Course Title and Code</b>	<b>Credit Hours</b>	<b>Category</b>
1- English I (ENG 103)	03 Credit Hours	
Compulsory Courses		
2- Pakistan Studies (PAK 101)	02 Credit Hours	
Compulsory Courses		
3- Introduction to Computers (BES 101)	03 Credit Hours	
Compulsory Courses		
4- ONE GENERAL COURSE	03 Credit Hours	
General Courses		
5- ONE GENERAL COURSE	03 Credit Hours	
General Courses		
6- ONE GENERAL COURSE	03 Credit Hours	
General Courses		

**Total: 17 Credit Hours**

#### **SEMESTER TWO**

<b>Course Title and Code</b>	<b>Credit Hours</b>	<b>Category</b>
------------------------------	---------------------	-----------------

1- English II (ENG 104)	03 Credit Hours
Compulsory Courses	
2- Mathematics (MAT 105)	03 Credit Hours
Compulsory Courses	
3- Critical Thinking (BES 103)	03 Credit Hours
Compulsory Courses	
4- Research Methodology (BES 106)	03 Credit Hours
Compulsory Courses	
5- ONE GENERAL COURSE	03 Credit Hours
General Courses	
6- ONE GENERAL COURSE	03 Credit Hours
General Courses	

**Total: 18 Credit Hours**

### **SEMESTER THREE**

<b>Course Title and Code</b>	<b>Credit Hours</b>	<b>Category</b>
1- Oral Communication (ENG 105)	03 Credit Hours	
Compulsory Courses		
2- Islamic Studies (ISL 101)	02 Credit Hours	
Compulsory Courses		
3- Statistics (MAT 205)	03 Credit Hours	
Compulsory Courses		
4- ONE GENERAL COURSE	03 Credit Hours	
General Courses		
5- ONE GENERAL COURSE	03 Credit Hours	
General Courses		
6- ONE GENERAL COURSE	03 Credit Hours	
General Courses		

**Total: 17 Credit Hours**

### **Course requirements after completion of three semesters**

#### **Foundation courses (08 courses)**

1. DST 301 Introduction to Microeconomics
2. DST 302 Introduction to Macroeconomics
3. DST 303 Theories of Development: contending Perspectives
4. HSS 400 Philosophy of Social Sciences
5. HSS 402 Qualitative Research Methods
6. HSS 401 Statistical Analysis of Social Data
7. DST 312 Rural Development: issues and Challenges
8. DST 310 Poverty Alleviation; contending Approaches

#### **Major Courses**

1. DST 308 Sociology of Development
2. DST 401 Sustainable Development: & livelihood Strategies
3. DST 402 Social Development: Issues and Approaches
4. DST 403 Civil Society and Development
5. DST 406 Women Empowerment: Issues and Perspectives

6. DST 410 Development Project: Planning, Appraisal & Implementation
7. DST 411 Development Project: Monitoring and Evaluation
8. DST 404 Global Development Experiments
9. DST 405 Globalization and World Development
10. DST 337 Governance Democracy and Development in Countries in Transition
11. DST 407 Community Development
12. DST 413 Law and Development
13. DST 338 Disaster Management and Assistance
14. DST 339 Foundation of Social Policy
15. Religion and Development
16. Human Rights and Development
17. Conflict and peace
18. Political paradigm in Developing Countries
19. Health and Development
20. Child Protection
21. DST 504 Internship

**Research Courses (03 Courses) [in Lieu of two Major Courses]**

1. RES 300 Review of Literature and Research Proposal
2. RES 400 Data Collection and Seminars
3. RES 500 Research Paper Writing and Defense

**Electives with Major (04 Courses) (Choice with Students)**

1. DST 307 Development Economics
2. DST 309 International Development
3. DST 408 Development Communication
4. DST 409 Development Policy: Process and Institutions
5. DST 414 Migration, Diaspora and Development
6. DST 336 Climate change Politics, Policy and Practice

**BS INTERNATIONAL RELATIONS ROAD MAP**

**Roadmap For First Three Semesters**

SEMESTER ONE			
Course Title and Code	Credit Hours	Category	
7- English I (ENG 103)	03 Credit Hours		
Compulsory Courses			
8- Pakistan Studies (PAK 101)	02 Credit Hours		
Compulsory Courses			
9- Introduction to Computers (BES 101)	03 Credit Hours		
Compulsory Courses			
10- ONE GENERAL COURSE	03 Credit Hours		
General Courses			
11- ONE GENERAL COURSE	03 Credit Hours		
General Courses			
12- ONE GENERAL COURSE	03 Credit Hours		
General Courses			

**Total: 17 Credit Hours**

**SEMESTER TWO**

<b>Course Title and Code</b>	<b>Credit Hours</b>	<b>Category</b>
7- English II (ENG 104) Compulsory Courses	03 Credit Hours	
8- Mathematics (MAT 105) Compulsory Courses	03 Credit Hours	
9- Critical Thinking (BES 103) Compulsory Courses	03 Credit Hours	
10- Research Methodology (BES 106) Compulsory Courses	03 Credit Hours	
11- ONE GENERAL COURSE General Courses	03 Credit Hours	
12- ONE GENERAL COURSE General Courses	03 Credit Hours	

**Total: 18 Credit Hours**

**SEMESTER THREE**

<b>Course Title and Code</b>	<b>Credit Hours</b>	<b>Category</b>
7- Oral Communication (ENG 105) Compulsory Courses	03 Credit Hours	
8- Islamic Studies (ISL 101) Compulsory Courses	02 Credit Hours	
9- Statistics (MAT 205) Compulsory Courses	03 Credit Hours	
10- ONE GENERAL COURSE General Courses	03 Credit Hours	
11- ONE GENERAL COURSE General Courses	03 Credit Hours	
12- ONE GENERAL COURSE General Courses	03 Credit Hours	

**Total: 17 Credit Hours**

**COURSE REQUIREMENTS AFTER COMPLETION OF THREE SEMESTERS**

**Foundation Courses (08 Courses)**

1. IRS 301 Theories of International Relations
2. IRS 307 International Relations since 1945
3. IRS 308 International Organizations
4. IRS 309 International Law
5. IRS 403 Theories of Globalization
6. IRS 302 Foreign Policy of Pakistan
7. IRS 303 Global Political Economy
8. IRS 314 Diplomacy

**Major Courses (14 Courses) [Choice with the Department]**

1. IRS 313 Foreign Policy Analysis
2. IRS 319 Government and Politics in Pakistan



3. IRS 310 Foreign Policies of Great Powers
4. IRS 401 Human Rights and Global Politics
5. IRS 402 Global Environmental Politics
6. IRS 409 Strategic Studies
7. IRS 410 Conflict and Conflict Resolution
8. IRS 417 Arms Control and Disarmament
9. IRS 323 Comparative Political Systems
10. IRS 311 American Foreign Policy
11. IRS 404 Issues in North-South Relations
12. IRS 408 International Terrorism
13. IRS 315 Politics of Developing Nations
14. IRS 411 Religion and Politics
15. IRS 412 Theories of Nationalism
16. IRS 413 Democratic Transitions: Issues and Challenges
17. IRS 321 Politics of Development
18. IRS 322 International Financial Institutions
19. IRS 415 Global Governance and Development
20. IRS 416 Politics of Social Welfare
21. IRS 312 The Muslim World and International Politics
22. IRS 330 Geo-Political Structure of the World

#### INTERNSHIP

#### **Research Courses (03 Courses) [in lieu of two Major Courses]**

1. RES 300 Review of Literature and Research Proposal
2. RES 400 Data Collection and Seminars
3. RES 500 Research Paper Writing and Defence

#### **Electives within Major (04 Courses) [Choice with Students]**

1. IRS 405 International Politics of South Asia
2. IRS 325 State and Society of South Asia
3. IRS 406 International Politics of Central Asia
4. IRS 320 Government and Politics in Central Asia
5. IRS 407 International Politics of Southeast Asia
6. IRS 326 American Government and Politics
7. IRS 327 Politics in European Union

IRS 328 Government and Politics in the Middle East

## BS (Anthropology) –Proposal for start of Stream in H&SS Dept: BUIC

### The Case

1. Since Media Studies is proposed to become a full-fledged independent department by Fall 2016, the H&SS department intends to replace BSS media studies with BS Anthropology. It is pertinent to note that 21st ACM decision No. 2111 also allowed the department to re-start BS Anthropology.
2. The roadmap for BS (Anthropology) is placed at annexure c.
3. There is a lot of demand from the BSS students to re-start BS Anthropology as a separate stream. The market also has the capacity to absorb students having degree in Anthropology.
4. The department should start BS Anthropology stream.
5. BS Anthropology be launched from Fall 2016.
6. Financial: Within limits allocated for purchase of books, journals and other content.
7. ONE FM needed.

### Annexures

#### *Scheme of Studies for* **B.S. ANTHROPOLOGY** (Proposed Commencement from Fall 2016)

#### PROGRAM SUMMARY

**Duration:** 04 years

**Semesters:** 08

**Credit Hours:** 136

**Course Load per Semester:** 15-18 Cr hrs.

### Adoption of HEC Revised Curriculum for BS Anthropology

A comparison between the proposed BU curriculum and the one which has been proposed by HEC is drawn in the following table:

<b>Courses</b>	<b>HEC Curriculum</b>	<b>BU Curriculum</b>
Compulsory Courses	10 Courses 30 Credit Hours	10 Courses 28 Credit Hours
General Courses	8 Courses 24 Credit Hours	8 out of 10 Courses 24 Credit Hours
Discipline Specific Foundation Courses	10 Courses 30 Credit Hours	10 Courses 30 Credit Hours
Major Courses Including Research Projects	13 Courses Credit Hours 39	10 Courses Credit Hours 33

Electives within Major	4 Courses 12 Credit Hours	9 out of 28 courses 27 Credit Hours
Total Credit Hours	136-142 Credit Hours	136 Credit Hours

## **PROGRAM COMPOSITION**

### **Compulsory Courses: 28 Credit Hours**

1.	English I	3
2.	English II	3
3.	Oral Communication	3
4.	Critical Thinking	3
5.	Introduction to Computers	3
6.	Research Methodology	3
7.	Mathematics	3
8.	Statistical Analysis of Data	3
9.	Islamic Studies	2
10.	Pakistan Studies	2
	<b>TOTAL</b>	<b>28 Credit Hrs.</b>

### **General Courses: 24 Credit Hours**

1.	Introduction to Media Studies	3
2.	Introduction to International Relations	3
3.	Introduction to Political Science	3
4.	Introduction to Philosophy	3
5.	Introduction to Economics	3
6.	Introduction to Psychology	3
7.	Introduction to Development Studies	3
8.	Introduction to Anthropology	3
9.	Introduction to Sociology	3
10.	Islamic History: The Formative Phase	3
	<b>TOTAL</b>	<b>24 Credit Hrs.</b>

### **Foundation Courses: (10 Courses | 30 Credit Hours)**

<b>Sr.</b>	<b>Courses</b>	<b>Credit Hours</b>
1.	Introduction to Anthropology	3
2.	Anthropological Theories	3
3.	Ethnographic Research Methods	3
4.	Kinship & Social Organization	3
5.	Physical Anthropology	3
6.	Archaeological Anthropology	3
7.	Linguistic Anthropology	3
8.	Social and Cultural Change	3
9.	Ethnology of Pakistan	3
10.	Applied Anthropology	3
	<b>TOTAL</b>	<b>30 Credit Hrs.</b>

### **Major Courses: (13 courses including Research Thesis| 33 Credits)**

<b>Sr.</b>	<b>Courses</b>	<b>Credit Hours</b>
1.	Economic Anthropology	3
2.	Anthropology of Beliefs and Rituals	3
3.	Medical Anthropology	3
4.	Environmental Anthropology	3

5.	Political Anthropology	3
6.	Urban Anthropology	3
7.	Anthropology of Globalization	3
8.	Epistemology of Ethnographic Research	3
9.	Anthropology of Development	3
10.	Research Thesis	6
	<b>TOTAL</b>	<b>33 Credit Hrs.</b>

**Electives: (9 Courses out of 28| Choice with Department)**

<b>Sr.</b>	<b>Courses</b>	<b>Credit Hours</b>
1.	Visual Anthropology	3
2.	Ethnomusicology	3
3.	Public Health	3
4.	Ethnomedicine	3
5.	Anthropology of Science and Technology	3
6.	Anthropology of Cyberspace	3
7.	Legal Anthropology	3
8.	Anthropology of Public Policy	3
9.	Migration and Diaspora	3
10.	Corporate Anthropology	3
11.	Anthropology of Food	3
12.	Political Ecology	3
13.	Anthropology of Anthropocene	3
14.	Disasters and Displacement	3
15.	Urban Anthropology	3
16.	Anthropology of South Asia	3
17.	Anthropology of Education and Learning	3
18.	Psychological Anthropology	3
19.	Sociolinguistics	3
20.	Asian Civilizations	3
21.	Museum Anthropology	3
22.	Forensic Anthropology	3
23.	Anthropology of Islam	3
24.	Gender and Society	3
25.	Anthropology of Peace and Conflict	3
26.	Myths and Folklore	3
27.	Ethnicity, Nationality, and Identity	3
28.	Anthropology of Art	3
	<b>TOTAL</b>	<b>27 Credit Hrs.</b>

## MS in HRM & Organizational Psychology (New Launch)

### The Case

1. In view of changed market environments, MS in HRM and OP appears more useful for the university to serve the society and industry. This will also be a good step of the department in program/ courses diversification. Details are attached at Appendage 1005.
2. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. There is a consensus that such program may be launched in order to utilize the strengths of various faculty (MS & IP in this case) in order to produce graduates in emerging fields of management.
3. Hence, it is recommended that The MS program in HRM and Organizational Psychology may be approved.

### Annexure

A. ACADEMIC DETAILS	
(1)	<b>Faculty / Institute / Department:</b> Departments of Management Sciences, Bahria University Karachi Campus
(2)	<b>Name of the Program:</b> Master of Science in HRM and Organizational Psychology MS (HRM &OP)
(3)	<b>Duration:</b> 2 Years ( 4 Semesters)
(4)	<b>Venue (s):</b> Departments of Management Sciences, Bahria University Karachi campus
(5)	<b>Whether the proposed program will be offered in (morning/evening/weekend)?</b> Evening
(6)	<b>Number of <u>Extra</u> Faculty Member(s) or Skilled-Worker(s) Required?</b> (Write the faculty members and skilled-workers, fulltime/Visiting, required in <u>addition</u> to the existing strength, along with their qualifications) 02
(7)	<b>Any <u>extra</u> class room(s) required? If yes, how many? And what will be their capacities required?(provide details)</b>  NO – Present classrooms are sufficient enough.
(8)	<b>Any <u>extra</u> laboratory/laboratories required? If yes, how many? And what <u>additional</u> equipment will be required?(provide details of equipment, use extra sheet if necessary)</b>  Nil: The Department has well established Research Lab that shall be used.
(9)	<b>Minimum Entry Level:</b> <ul style="list-style-type: none"> <li>• 16 years of education from HEC recognized educational universities / institutes, students with management sciences and psychology / sociology background.</li> <li>• CGPA 2.50 or above in the final degree, on hand, if degree obtained from a CGPA based system.</li> <li>• Minimum 50% marks if degree obtained from a non-CGPA program.</li> <li>• Must pass Bahria University Admission Test.</li> </ul> <p style="text-align: center;">And / Or</p> <ul style="list-style-type: none"> <li>• GAT General with 50 marks obtained in less than two years prior to admissions.</li> </ul>

	(policies of HEC shall apply as amended from time to time)
(10)	<b>Admission Criteria:</b> As per BU Policy
(11)	<b>Proposed Date of Commencement:</b> Fall 2016
(12)	<b>Mode of Study / Examination:</b> (Semester / Annual / Bi-Annual) Semester System
(13)	<b>Brief Description &amp; Rationale of the Program:</b> <ul style="list-style-type: none"> <li>Department of Management Sciences, Bahria University Karachi Campus is already running programs like MS (Fin), MPhil and MS (PM). MS in HRM and Organizational Psychology will add diversity to the studies.</li> <li>MS (HRM&amp;OP) combines human resource management and its psychological dimensions. The programme is designed for graduates / professionals with strong desire of attaining comprehensive understanding of organizational functioning in the contemporary highly competitive environments.</li> <li>The program has also been approved by competent authority / Academic Council of the University.</li> <li>We plan offering this program in the evening for the convenience of students.</li> </ul>
(14)	<b>Complete Plan of Studies:</b> <i>Department of Management Sciences, BUKC will follow the approved Road Map of MS (HRM &amp;OP) (Attach complete roadmap with semester wise breakup)-attached</i>
(15)	<b>Course Outlines</b> (Attach course description for each course along with pre-requisite courses required) - attached
(16)	<b>Examination Policy:</b> We will follow the examination Policy Bahria University
(17)	<b>Number of Admissions Expected for First Intake:</b> 15-20 students
(18)	<b>Number of Admissions Planned/Expected for Subsequent Intakes:</b> 10 % increase every semester
(19)	<b>Date of Approval by the Board of Study?</b> (Write the date. If approval is conditional, write all the conditions) Already Done

## B. FINANCIAL ANALYSIS

(1)	<b>Any Agency (Public/Private) Funding this Program (Fully/Partially)?</b> <i>(Provide complete details including extent of funding and mode of disbursement) NIL</i>
(2)	<b>Expected Earning from First Intake:</b> 1.00 million (per semester)
(3)	<b>Projected Earnings for the Next Five Years:</b> 20 % increase per semester
(4)	<b>Total Estimated Salaries of all Extra Human Resources per Annum:</b> 0.7 million
(5)	<b>Cost of <u>Extra</u> Laboratory Equipment/Tools (if required):</b> NIL
(6)	<b>Cost of <u>Extra</u> Books for the Library: (if required):</b> Nil
(7)	<b>If the Venue is Hired, provide Annual Rental Expenses and Cost of other Fixtures:</b> NIL
(8)	<b>Miscellaneous Expenses Required for Starting the Program:</b> <i>(Write all expenses required for Furniture, Marketing, Advertisements, Prospectus-Printing etc.)</i>  Approximately Rs. 0.2 million per year for maintenance and upgrading classroom / research lab.
(9)	<b>Total Annual Recurring Expenditures Required in Subsequent Years: (like Salaries, Advertisements, Stationeries etc)</b> 0.3millions

## C. PROGRAMME VIABILITY

(1)	<b>Total Expenditures Required: Add B(4) to B(8)</b>	≈ Rs 0.9 million per semester
(2)	<b>Net Expenditures Required: Subtract B(1) from C(1)</b>	≈ Rs 0.9million per semester
(3)	<b>Net Earnings in First Year: Subtract C(2) from B(2)</b>	≈ 0.1 million rupees
(4)	<b>Projected Annual Gross Earning in Subsequent Years:</b> ≈ + 0.2 million rupees per annum , will differ with intake	
(5)	<b>Projected Annual Net Earning in Subsequent Years: Subtract B(9) from C(4)</b> The program shall become more profitable in coming years.	

### **Road Map for MS in HRM & OP**

Bahria University is one of the leading universities of the country. It has signed agreements / MOUs with over 20 universities around the world and the number is growing. There has been repeated exchange of programs and exchange of students among these educational institutes. Bahria University is also committed in providing International Certifications to its students that improves international acceptability and credibility of its students / alumni.

The course contents that are listed below are the ones most suited in the current local and international market scenario. The course contents and the subjects offered may change over a period of time based on Bahria University collaboration with other notable institutes / organizations / International Certifications providers locally and worldwide. However the duration of the degree and the number of courses offered (24-months and 36-credit hours) will stay in line with the policies of Higher Education Commission of Pakistan.

Semester-wise details of the courses offered are attached below:

#### **Semester-1**

<b>Srl. #</b>	<b>Course Title</b>	<b>Level</b>	<b>Cr. Hrs.</b>
1	Contemporary HRM and practices	Core	3
2	Personnel selection and advanced counseling skills	Core	3
3	Organizational psychology and psychometrics	Core	3

#### **Semester-2**

<b>Srl. #</b>	<b>Course Title</b>	<b>Level</b>	<b>Cr. Hrs.</b>
1	Applied attitude and behavioral analysis	Core	3
2	Contemporary issues in business and industry	Core	3
3	Elective -I	Elective	3

#### **Semester-3**

<b>Srl. #</b>	<b>Course Title</b>	<b>Level</b>	<b>Cr. Hrs.</b>
1	Advance research methodology and proposal development	Core	3
2	Elective-II	Elective	3
3	Elective-III	Elective	3

#### **Semester-4**

<b>Srl. #</b>	<b>Course Title</b>	<b>Level</b>	<b>Cr. Hrs.</b>
1	Internship	Compulsory	3
2	Research thesis	Compulsory	6

**List of Electives:** The list is as given below. It provides areas for academic pursuits covering wide spectrum of human resource management and organizational psychology.

<b>Srl. #</b>	<b>Course Title</b>	<b>Cr. Hrs</b>
1	Leadership issues in Organizations: Concepts and Applications	3
2	Theories of learning and conditioning	3
3	Communication strategies of scholars	3
4	Seminars in organizational behaviours	3
5	Culture and persuasion	3
6	Social and self-development	3
7	Abnormal psychology	3
8	Industrial relations and labour laws	3
9	Seminars in organizational development	3
10	Seminars in human resource development	3

MS (HRM&OP) combines human resource management and its psychological dimensions. The programme is designed for graduates / professionals with strong desire of attaining comprehensive understanding of organizational functioning in the contemporary highly competitive environments.

The course contents focus on social, psychological and administrative processes operate in organizations in relation with emerging systems and structures.

## **COURSES OUTLINES**

### **CONTEMPORARY HRM & PRACTICES:**

#### **Course Description**

The subject builds on existing knowledge in the areas of HRM and relates it to specific conceptual and empirical issues in international HRM. It increases awareness and understanding of issues beyond the scope of topics covered in traditional courses. Some of the issues covered include contemporary.

#### **HRM issues its concepts and applications.**

This course introduces the field of HRM, issues, concept and applications. It addresses the complex environment of HRM and the need to investigate its various economic, social, political, cultural and legal dimensions from conceptual, methodological and applications perspectives. It then considers how these environmental factors should affect, and can be integrated into, HRM programs and strategies.

**Course Objectives** The basic objective of this class is to facilitate your understanding of the nature, structure, and distinct characteristics of HRM. Further, through case studies and article project, the course should develop your ability to adapt HRM strategies to specific organizational scenarios and constraints

#### **Topics**

- 1.The Scope and Challenge of HRM
- 2.The Dynamic Environment of HRM
- 3.The Foundation of Organizational Culture
- 4.Cultural Dynamics in Assessing organizational environment
5. International perspective of HRM
- 6.The Political Environment:A Critical Concern
- 7.The Legal Environment
- 8.Developing a Global HRM Vision Through HRM Research
- 9.Global HRM Management: Planning and Organization
- 11.Special Issues in HRM

#### **Required Reading Resources:**

Redman, T., Wilkinson A., (2006) *Contemporary Human Resource Management*: (2 ed.) FT Prentice Hall Perrin, R. (2004). *Pocket guide to APA Style* Boston: Houghton Mifflin

**Recommended Resources** Dessler, G., Griffiths, J., & Walker, B. L. (2008). *Human Resource Management* (3 ed.) Frenchs Forest: Prentice Hall Beardwell, I., & Holden, L. (1994). *Human Resource Management: A Contemporary Perspective*. London: Pitman. M. Marchington, A. W. (1996). *Core Personnel and Development* Wiltshire CIPD. Millmore, Lewis, Saunders, Thornhill, & Morrow (2007). *Strategic Human Resource Management Contemporary Issues*. Essex: Prentice Hall Mondy, R. W. (2008). *Human Resource Management*, (10 ed.). New Jersey: Prentice Hall Pilbeam, S. (2006). *People Resourcing Contemporary Human Resource Management in Practice*. Essex: Prentice Hall. R. Boam., P. S. (Ed.). (1992). *Designing and Achieving Competency*. Maidenhead: McGraw-Hill

### **PERSONAL SELECTION AND ADVANCE COUNSELLING SKILLS:**

#### **Course Description**

- 1) This course lays the foundation of the advanced concepts of counseling



- 2) Development of knowledge and familiarity with a broad range of counseling.
- 3) Be able to understand and articulate theories of care found in each theoretical Orientation discussed in class.
- 4) Be able to translate theoretical understanding into practical applications
- 5) Learn basic counseling skills that will enable students to offer care and counseling to persons in need.
- 6) Be able to develop an integrative approach to counseling.
- 7) Understanding do's and don'ts of counselling
- 8) To familiarize students with various types of psychotherapy and counselling.
- 9) To assist students in developing an understanding of ethics as applied to psychotherapy and counselling
- 10) To assist students in acquiring basic practice management and referral skills
- 11) It aims at developing an insight into the process of counseling

## **Course Contents**

### **Topics**

#### Introduction of counseling

- Definition
- Counseling is not about
- Aim of counseling
- differences between counseling and other helping professions

#### Basic counseling skills

- Core conditions of counseling
- Counseling situation
- Non verbal skills
- Verbal skills
- Attending skills
- Listening skills
- Active listening

#### Characteristics of effective counselor

- Personal characteristics
- professional characteristics
- Person centered counseling approach

#### Counseling situation

- Conditions and situation where counseling is indicated
- Structure of counseling
- Structure of counseling session
- Beginning phase
- Middle phase
- Termination phase

#### History of counseling

#### Types of counseling

#### Psychodynamic approach of counseling

- Theatrical concepts
- Goal of counseling
- Nature of relationship
- Counseling techniques
- Humanistic approach of counselling
- Cognitive behavioral approach
- Ethical issues in counselling

#### Personality profiling

#### Recruitment and selection

#### Role of psychologist in Recruitment and selection

**Reference Material:**

- Corey, G. (2000) *Theory and Practice of Counseling and Psychotherapy*; Wadsworth Publications.
- Hecker. J. &Thrope. G. L. (2005) *Introduction to Clinical Psychology: Science, Practice & Ethics*. Pearson Edition
- Korchin.S.J (1976) *Modern Clinical Psychology; Principles Of Intervention In The Clinic And Community* New York ; Basic Books Inc
- Kaplan. H.I., SADOCK. B.J., & Grebb. J. A. (1994) *Synopsis of psychiatry Behavioral* (7<sup>th</sup>ed) Baltimore Williams and Wilkins.
- Richard S. Sharf ,*Theories of Psychotherapy & Counseling: Concepts and Cases / Edition 4*, Thomson Brooks /cole.

**ORGANIZATIONAL PSYCHOLOGY AND PSYCHOMETRICS:****Course Description**

- 1) To introduce the field of organizational psychology, its nature, aims and scope.
- 2) To be familiar with the various concepts and research methods used in organizational psychology.
- 3) To develop an understanding of important concepts such as personnel selection, job analysis, training, selection, criterion development, performance appraisal, achievement, motivation, job satisfaction.
- 4) After this course student will be skilled in job analysis and evaluating KSAOS during selection and recruitment.
- 5) The student will be able to assess training procedures and be able to conduct training workshops.
- 6) The student will have the basics of professionalism and ethics while working in organizations and how to enhance motivation and achievement.

**Course Contents**

1. Introducing Organizational Psychology
  - ✓ Defining Industrial-Organizational Psychology
  - ✓ Organizational and Applied Psychology
  - ✓ Defining organizations
  - ✓ Differentiating between industries and organizational divisions
  - ✓ Human Relations Movement
  - ✓ Scope of organizational psychology
  - ✓ Dual nature of I/O Psychology (scientist- practitioner model)
2. Historical Background
  - ✓ Historical Background early years (1900–1916)
  - ✓ During World War-I and II (1917–1940)
  - ✓ After World War-II (1941–1945)
  - ✓ Towards Specialization (1946–1963)
  - ✓ The Modern Era (1964–Present)
3. Research Methods In I/O Psychology
  - ✓ Brief introduction to research methods, designs and questions used in organizations
4. Job Analysis
  - ✓ Job oriented and person oriented approach
  - ✓ Purpose and methods of job analysis
  - ✓ Sources of information

- ✓ Job evaluation

#### 4. Personnel Selection

- ✓ Recruitment, selection and placement
- ✓ Psychological tests in selection and recruitment
- ✓ Influence of personality and ability tests
- ✓ Job related characteristics and Predictors

KSAOS

#### 5. Training And Development

- ✓ Need assessment
  - ✓ Training need analysis
  - ✓ Pre-test and post-test training
  - ✓ Training designs and methods
- Delivering and evaluation of training program

#### 6. Job Satisfaction & Commitment

- ✓ Nature & antecedents (Job satisfaction)
- ✓ Assessment of Job satisfaction
- ✓ Commitment and its components
- ✓ Assessment of commitment

#### 7. Achievement and Motivation

- ✓ Need Theories
- ✓ Reinforcement Theory
- ✓ Expectancy Theory
- ✓ Self Efficacy theory
- ✓ Equity theory
- ✓ Goal setting theory

#### 8. Employee Health and Safety

- ✓ Physical conditions
- ✓ Work schedules
- ✓ Job stress
- ✓ Accidents & Burnout

#### 9. Productive And Counterproductive Employee Behavior

- ✓ Productive behavior
- ✓ Counterproductive behavior
- ✓ Organizational citizenship behavior

#### 10. Ethics, Religious And Cultural Issues

- ✓ Religious, cultural and ethical issues
- ✓ Ethics outline {as given by SIOP (APA), EAWOP & BPS}

Books:

1. Ethics at work
2. Harvard Business Review: few cases related to ethical issues

#### **Reference Material**

##### **Course Book:**

Spector, P. E. (1996). *Industrial and Organizational Psychology: research and practice*.

USA: John Wiley & Sons, Inc.

**Recommended Books:**

- Jex, S. M. (2006). *Organizational psychology: a scientist practitioner approach*. USA: John Wiley & sons.
- Kreitner, R. & Kinicki, A. (2001). *Organizational Behavior* (5<sup>th</sup> ed.). USA: McGraw-Hill Companies Inc.
- Larmer, R. A. (2002). *Ethics in the workplace: selected readings in business ethics* (2<sup>nd</sup> ed.). USA: Wadsworth / Thomson learning.
- Lussier, R. N. (1999). *Human relations in organizations: applications and skill building* (4 ed.). USA: Irwin/McGraw-Hill Companies Inc.
- Muchinsky, P. M. (2003). *Psychology applied to work: an introduction to industrial and organizational psychology* (7<sup>th</sup> ed.). USA: Wadsworth / Thomson learning.
- Robbins, S. P., Judge, T. A., & Sanghi, S. (2007). *Organizational Behavior*. (12<sup>th</sup> edition) (2<sup>nd</sup> impression 2008), India: Dorling Kindersley Pvt. Ltd.

**APPLIED ATTITUDE AND BEHAVIOURAL ANALYSIS:**

**Course Description**

1. Make student understand the historical and current trends in the field of Social psychology.
2. Aims to explain the implications of social psychological research and theories for individuals and society.
3. Student will be introduced to main paradigms of social psychology, with emphasis on key concepts e.g. attribution, prejudice, attitudes etc.
4. The present course also provides an introduction to applied behavioural analysis in the fields of clinical, educational and I/O psychology.
5. It will provide an overview of the history and principles of behaviour, characteristics of ABA, how to select target behaviours and outcomes how to define, record and graph behaviour and how to perform preference assessment.

**Course Contents**

The Field Of Social Psychology

- Definition
- Historical Roots of Social Psychology
- Theories in Social Psychology
- Research Methods in Social Psychology
- Research Ethics

Social Perception

- Nonverbal Communication
- Attribution
- Theories of Attribution
- Applications of Attribution Theory
- Impression Formation and Impression Management

Attitudes

- Attitude Formation.

Persuasion

Cognitive Dissonance

Prejudice

- Definition of Prejudice and Discrimination.
- Origins of Prejudice
- Reduction of Prejudice (Techniques)

Social Influence

- Conformity
- Compliance
- Obedience

Overview of All Behaviourist Theorists

- Associationistic: Pavlov, Guthrie, Estes
- Functionalistic: Watson, Thorndike, Skinner, Hull
- Cognitive Approach: Piaget, Tolman, Bandura

- Neurophysiological: Hebb

Areas of Applicability

Principles Governing Classical Conditioning and Operant Conditioning

Punishment and Reinforcement Types

Behavioural Interventional Plan (BIP)

Procedure of ABA

- Shaping
- Channing
- Positive reinforcement
- Negative reinforcement
- Token Economy
- Differential reinforcements

Discrete Trial Teaching/Learning (DTT)

Differential Reinforcement

- DRL
- DRA
- DRI
- DRO

Methods of Data Collection in ABA

Intervention Plans

ABA in Different Settings

Criticism on ABA

### **Reference Material:**

Text Book:

- Baron, R. A., Byrne D., & Branscombe, N. R. (2006). *Social psychology* (11<sup>th</sup> ed.). USA: Pearson Education, Inc.

Reference Books:

- Taylor, S. E., Peplau L. N., & Sears D. O. (2006). *Social psychology* (12<sup>th</sup> ed.). USA: Pearson Education, Inc.
- Lowie, R. H. (1953). *Social organization*. NY: Pinchart and Company Publishers, Incorporated.
- Gergen, K. J., & Gergen M. M. (1981). *Social psychology*. USA: Harcourt Brace Jovanovich, Inc.
- Ibanez, T., & Iniguez L. (1997). *Critical social psychology*. London: SAGE Publication Ltd.
- Myers, D. G. (1996). *Social psychology* (5<sup>th</sup> ed.). USA: McGraw-Hill Co, Inc.
- Baron, R. A., Byrne D., & Johnson B. T. (1998). *Exploring social psychology* (4<sup>th</sup> ed.). USA: Allyn and Bacon.
- Martin, G.; Pear, J. (2003) Behaviour Modification. What It Is and How to Do It. 7<sup>th</sup> Edition. Pearson Education, Inc. USA.
- Bambrill, Eileen D. Behaviour Modification Handbook of Assessment, Intervention and Evaluation Part I and II.
- Kaplan, Joseph S.; Carter, Jane. (1995) Beyond Behaviour Modification – A Cognitive Behavioural Approach to Behaviour Management in the School. 3<sup>rd</sup> Edition. Pro-d Publishers.
- Ormrod, Jeanne Ellis (1999) Human Learning. 3<sup>rd</sup> Edition. Merrill, an imprint of Prentice Hall.
- Maurice, Catherine; Green, Giena; Luce, Stephen C. (1996) Behavioural Intervention for Young Children with Autism: A Manual for Parents and Professionals. Pro – Ed.
- Dickman, Irving R. (1976) Behaviour Modification
- Domjan, Michael (2003) The Principles of Learning and Behaviour 5<sup>th</sup> Edition. Thomson Wadsworth Publishers
- Klein, Stephen B. (1991) Learning – Principles and Applications. 2<sup>nd</sup> Edition. McGraw Hill Inc.
- Rimm, D.C.; Masters, J.C. (1979) Behaviour Therapy, Techniques and Empirical Findings, 2<sup>nd</sup> Edition. Academic Press.
- Watson, John B. (1959) Behaviourism. Phoenix Books.
- Hilgard, Ernest R. (1956) Theories of Learning 2<sup>nd</sup> Edition Appleton – Century – Crofts – Inc.
- Hergenhahn B. R.; Olson, M.H. (2005) An Introduction to Theories of Learning. 7<sup>th</sup> Edition. Pearson, Prentice Hall.

- Mitchell, M.L.; Jolley, J.M.; O'Shea, R.P. (2007) Writing for Psychology 2<sup>nd</sup> Edition. Thomson Wadsworth Publishers
- Schultz, Duane P. (1996), A History of Modern Psychology (8<sup>th</sup> ed.), Harcourt Brace

## **CONTEMPORARY ISSUES IN BUSINESS AND INDUSTRY:**

### **Course Description**

This course is the study of many factors that relate to business and management which focusing on the significant current trends and issues that impact society and individual both on a national and global level. It creates an awareness of issues beyond the scope of topics covered in conventional business.

### **Course contents**

1. Introduction of contemporary issues in management sciences
2. Globalization & Regionalization
3. Downsizing
4. Ownership
5. Ethics
6. Work-force diversity
7. Extremism
8. Quality & Productivity
9. Innovation
10. Organizational Performance
11. Ethics
12. Work-force diversity
13. Extremism
14. Innovation
15. Organizational Performance
16. Quality & Productivity
17. Final Projects
18. Internal Control Mechanisms of Corporation
19. Corporate Social Responsibility
20. Corporate Governance
21. External Control Mechanisms of Corporation

## **Reference Material:**

### **Journals:**

- Academy of Management Review.
- Academy of Management Journal.

## **ADVANCED RESEARCH METHODOLOGY AND PROPOSAL DEVELOPMENT:**

### **Course Description**

This core course introduces students to the research methods for finding the answers to the questions of academic and professional nature. By examining critically the conceptuality and applications drawn on both the qualitative and quantitative aspects of research, it further clarifies the research concepts of students. This course offers an overview of the different approaches and challenges involved in social research by focusing at the dimensions, structure and process of

1. To develop attitude and type of thinking involved in research among the students.
2. To teach them the concepts, terminology and techniques used in research.
3. To provide them with a foundation for research structure and processes.

After having completed this course, participants will be able to:

- Express the understanding of research and its process
- Differentiate between the qualitative and quantitative research
- Read and interpret the research work done by others

## **Topic**

1. Kinds and Dimensions of Research
2. Research Philosophy, positivist vs non-positivist approaches
3. Qualitative vs Quantitative approaches of research. Population, Target population, Sampling and Instruments.
4. Design of a good research paper
5. Research Proposal Writing – Project Assignment: Topic Selection.
6. Research Proposal Writing: Introduction.
7. Research Proposal Writing: Methodology
8. Research Proposal Writing: Literature Review
9. Research Proposal Writing: Data Collection - Instruments & protocol
10. Research Proposal Writing: Data Analysis and Interpretation. Use of SPSS.
11. Research Proposal Writing: Discussion; Conclusion.
12. Project Assignment Submission & Presentation.
13. Final Examination.

## **Course reference material**

### **Text Book:**

Neuman, W. L. ( 2011). Social Research Methods: Qualitative and Quantitative Approaches, 7th edition. Allyn & Bacon. (Below this edition is also acceptable.)

### **Reference Book:**

Louise, S. (2014). Quantitative Methods for Business Management and Finance, 4<sup>th</sup> edition, Palgrave Macmillan.

**Articles:** Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly

aims to stimulate Leadership qualities in the participants and prepare them to become leaders in their own right. Students shall also learn to determine leadership opportunities. The significance of a team and team leadership is a major highlight of this course. A scholarly insight into contemporary leadership concepts, theories and their applications in organisations is also inculcated through the introduction of various leadership theories and examples of real life leaders. In short, the course will attempt to change student attitudes and prepare them to work outside their comfort zone in challenging environments.

### **Text Books**

- 1) Leadership Theory and Practice by Peter G Northouse 6<sup>th</sup> Edition
- 2) Leadership: Research Findings. Practice and Skills (Sixth Edition) by Andrew J DuBrin
- 3) The Leadership Experience by Richard L. Daft 4<sup>th</sup> Edition
- 4) Leadership Theory, Application & Skill Development Robert N Lussier, Christopher F Achua

### **Reference Books**

- 1) HBR's 10 must Reads on Leadership
- 2) Leadership: The Care and Growth Model (third Edition) by Etsko Schuitema
- 3) Harvard Business Review
- 4) New York Times (Columns: "Corner Office" and "Global Manager") & Economist
- 5) PERN & Newspaper Articles

## **THEORIES OF CONDITIONING AND LEARNING**

### **Course Description**

1. This course provides students with conceptual knowledge of learning principles
2. It aims to uncover the foundation core of the school of behaviorism and the various theories that follow the school.
3. It will enable the students to appreciate the differences between the various kinds of learning, their conceptual theme and critical analysis.

### **Course Contents**

#### **INTRODUCTION TO BEHAVIOURISM**

- Historical roots of behaviourism
- Behaviourism as a school of thought
- Assumptions of behaviourism
- Empirical nature

#### **LEARNING**

- Definition
- Nature of Learning theories
- Traditional learning theory: S-R views

#### **JOHN B. WATSON – THE FOUNDER**

- Basic principles of behaviorism
- Methodology of human study
- Concept of personality
- Contributions
- Critical Analysis

#### **THORNDIKE - CONNECTIONISM**

- The basic concepts
  - Laws of Effect, Use, Readiness
  - Experiments
- Contributions and critical analysis

#### **IVAN PAVLOV- CLASSICAL CONDITIONING**

- Concept of classical conditioning
- The conditioning procedure
- Important concepts in conditioning
  - Extinction
  - Generalization
  - Higher-order conditioning

Contributions and critical analysis

#### **B. F. SKINNER- OPERANT CONDITIONING**

- Basic concepts of operant conditioning
- Types of reinforcers
- Schedules of reinforcement
- Shaping

Contributions and critical analysis

#### **HULL – DRIVE REDUCTION THEORY**

- The basic concepts
- Concept of reinforcement
- Law of habit formation

Contributions and critical analysis

#### **GUTHRIE – CONTIGUOUS LEARNING**

- Basic Concepts
- Law of association
- Implications of theory

Contributions and critical analysis



## TOLMAN

- Basic Concepts
- Purposive Behavior
- Place Learning
- Implications of theory

Contributions and critical analysis

## DOLLARD AND MILLER

- Basic Concepts
- Frustration-Aggression Hypothesis
- Four factors of learning
- Implications of theory

Contributions and critical analysis

## ALBERT BANDURA

- Basic Concepts
- Social Cognitive theory
- Defensive behaviors
- Implications of theory
- Contributions and critical analysis

## ReferenceMaterial

- Bem, A.P. (1997). Personality theories: development, growth and diversity, second edition, Allyn and Bacon, Boston.
- Hilgard, E. R. (1956). Theories of learning. Second edition, Appleton-Century-crofts.
- Schultz, D. P. (2004). A history of modern psychology, eighth edition, wadsworth, Thomson learning, Inc. USA.
- Ormrod, J.E. (1999). Human Learning, third edition, Prentice-Hall Inc. NJ. USA.
- Hergenhahn, B. R. & Olson, M. H. (2005). An introduction to the theories of learning, seventh edition, NJ.USA.
- Feist, ( ). Theories of personality.

## COMMUNICATION STRATEGIES

- Definition and basic forms of communication
- Importance of effective Communication in business
- Communication Challenges in today's workforce
- Process of communication
- Functions& forms of organizational communication(external, internal)

## **Role of marketing& public relations department in external communication**

- Crises communication, communication through press release. writing press release
- Communication barriers
- Characteristics of effective communication
- Differences in intercultural communication

## **Developing oral presentations skills**

- Planning steps for preparing oral presentations
- Delivering effective presentation
- Strategies for reducing stage freight
- Principles of effective writing techniques

## SEMINARS IN ORGANIZATIONAL BEHAVIOR

**Organizational Behavior** is the study that investigates the impact that individuals, groups, and structure have on behavior within organizations, for the purpose of applying such knowledge toward

improving the organization's effectiveness. As such, OB is concerned with the study of what people do in an organization and also the matters related to employee motivation, work groups, work teams, org structure, OD & change management. Organizational goals and objectives are achieved by the Managers with the help of other people. To perform their tasks successfully, today's Managers are faced with new challenges and they are required to be equipped with more than one skill; technical skills only are not enough; additional skills, including interpersonal skills and decision making skills are equally important.

### **Textbooks**

1. Organizational Behavior, 15<sup>th</sup> Edition, (by Stephen P. Robbins).
2. Organizational Behavior, 8<sup>th</sup> Edition (by Fred Luthans)
3. Behavior in Organizations, 6<sup>th</sup> Edition (by Jerald Green Berg & Robert A. Baron)

## **CULTURE AND PERSUASION**

### **Course Description**

1. To provide an introduction to psychological concepts, theories and research findings, in cross cultural psychology.
2. The course thus aims to provide the skills to be able to evaluate and become more aware of cultural variation and how cultural factors influence human behaviour.
3. Critically evaluate cultural and cross-cultural theory
4. Have greater experiential awareness about the importance of culture in people's lives and in psychology.
5. Competently understand issues surrounding those who are perceived as culturally different.

### **Course Contents**

#### Introduction to Cross Cultural Psychology

- What is culture?
- Why is culture important?
- Cultural psychology versus Cross Cultural Psychology
- Psychological approaches to study culture.
  - Triandis: subjective culture
  - Hofstede: dimensionalizing cultures

#### Acculturation, Culture Shock and Intercultural Communication

- Culture, identity, and intergroup relations

#### Identity and multicultural society

#### Culture and psychological research

#### Culture and basic processes

- Perception

#### Cognition

#### Culture and development

- Parenting styles

#### Adolescent development

#### Culture and Gender

#### Culture and Health

#### Culture, abnormal behavior, and its treatment

#### Culture and Social behaviour

- Culture and Emotion

#### Culture and Language

#### Culture and Personality

- McCrae: cross-cultural research on the five-factor model of personality

#### Contemporary world issues in Cross cultural psychology

#### SEMINAR on Cross Cultural Psychology

### **Reference Material**

Text Book:

- Keith, K.D. (2011). *Cross-Cultural Psychology - Contemporary Themes and Perspectives*. Wiley - Blackwell

#### Reference Books:

- Shiraev, E. & Levy, D. (2007). *Cross Cultural Psychology – Critical Thinking and Contemporary Applications*. Allyn& Bacon.
- Cour, A. & Zaheer, N. (2011). *The Eight Neighbours – Together We Survive*.
- Online readings: [http://www.wvu.edu/culture/contents\\_complete.htm](http://www.wvu.edu/culture/contents_complete.htm)

### SOCIAL AND SELF-DEVELOPMENT

#### Course Description

This course is designed to increase your success in university, work life and in your personal life. This will help you increase your self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, a positive attitude, self-discipline, and self-motivation. Furthermore, exploring personality, interests and values to increase self-understanding and select an appropriate major and career. Examine adult stages of development and develop a plan for wellness and living a long and healthy life. Learn strategies for motivation and stress management. This course will also help you adjust to transitions in life. By participating in class activities and discussions and by completing the activities in your text, you will build a valuable record of your dreams, goals, skills, interests, values, and more.

#### Course Content

Brief introduction to psychology

Introduction to Social and Emotional Development

#### **Theories :**

Social and Emotional Development theory by Erik Erikson

Lawrence Kohlberg stages of Moral Development

Problem Solving, Critical Thinking and Decision making

Decision making

1. *Identifying the six steps in problem solving*
2. *Describing the purpose of each step in problem solving*
3. *Explaining the actions to be taken in each step*
4. *Applying techniques for promoting creativity in problem solving for use with both individuals and groups*
5. *Decision making styles*
6. *Leadership styles*

Emotional Intelligence

Assertiveness.

Aggression

Submissive

Intelligence

Howard Gardner Multiple intelligence

Types

Use in education

Motivation

Intrinsic and extrinsic motivation

Locus of control

Why we lose motivation

Abraham Maslow's Hierarchy of needs

Herzberg (1968) Two-Factor Or Motivation-Hygiene Theory

Expectancy Theories

Equity Theories

Value of a university education

Lifelong Learning(Psychological Principles of Learning and Memory)

Memory

- i. Stages of memory: sensory register, short and long-term memory
- ii. Principles of forgetting and memory
- iii. Improving Memory techniques
- iv. Memory reconstruction
  - Assimilation error
  - Sharpening error
  - Leveling error
- i. Method of serial reproduction
- ii. Learning
- iii. Classical conditioning
- iv. Operant conditioning
- v. Schedules of reinforcement
- vi. Law of effect

Stress Management

- i. Physiology of stress(how it effects body)
- ii. Types of stress
- iii. Cognitive Errors
- iv. Stress management techniques

Personality theories

Sigmund Freud

Psychoanalytic theory of personalitylevel of consciousness

- ID
- Ego
- Super Ego

Stages of psychosexual development

- Oral
- Anal
- Phallic
- Latency
- Genital

Defense Mechanism

- Rationalization
- Projection
- Reaction formation
- Regression
- Repression
- Denial
- Sublimation

Research methods

- Types

(Describing a psychological experiment)

- Correlational research
- Experimental research
- Naturalistic observation
- Interview, can be structured or unstructured.
- Archival research
- Case study

- Advantages **and** disadvantages of research methods

#### Transactional Analysis

1. The Ego-State (or Parent–Adult–Child, PAC) model
2. Analyzing Transactions
3. Life positions
4. Strokes
5. Games people play
6. 5 typical features of games
7. Drama triangle
  - Persecutor
  - Victim
  - Rescuer

#### Anger Management

1. Types of anger
2. How it effects body
3. Identifying triggers
4. Techniques to overcome anger
  - Black paper
  - Rubber band
  - Counting backward

#### Persuasion

- i. Attribution theory [https://en.wikipedia.org/wiki/Persuasion - Conditioning theories](https://en.wikipedia.org/wiki/Persuasion_-_Conditioning_theories)
- ii. cognitive dissonance theory
- iii. Persuasion techniques

#### **Reference Material**

##### Course book

*Basic psychology, 5<sup>th</sup> edition by Henry Gleitman, Alan J. Fridlund and Daniel Reisberg*

- *Games People Play: The Psychology of Human Relationships* by Eric Berne
- *Introduction to psychology, 14<sup>th</sup> edition* by Atkinson and Hilgard
- *Born to win* by Murial Dorothy Jongeward.
- *Transaction Analysis counseling in action, 2<sup>nd</sup> edition* by Ian Stewart.
- *Psychology* by David G Myers.
- *Psychology, 3<sup>rd</sup> edition* by Robert J. Stenberg
- *Life span Development* by Helen Bee.
- *Life span Development* by Sigelman Rider
- *Life span Development* by Santrock.
- *Management* Kathryn M. Bartol and David C Martin.
- *The Psychology of conflict and conflict management in organization* by Carsten K W De Dreu and Michele J Gelfard.
- *Managing Stress* by Brain Luke Seaward.
- *Skill for success, Personal Development and Employability* by Stelia Cottrell
- *Critical thinking skills, developing Effective Analysis and Argument* by Stella Cotterll.
- *Persuasion, the art of influencing people, 4<sup>th</sup> Edition* by James Borg

### **ABNORMAL PSYCHOLOGY**

#### **Course Description**

- 1) This course lays the foundation of basic concepts of abnormal psychology and draws the difference between normal / abnormal behaviour and personality patterns.
- 2) It aims at enabling the student in making out the difference between the various schools of thought on criteria of abnormality.
- 3) Develops an insight into the various Psychological disorders' symptoms and their etiology.
- 4) Familiarize the students with the diagnostic criteria of DSM 5.

- 5) It aims at developing an insight into the various Psychological disorders' symptoms and their etiology with the reference of different school of thought.

### **Introduction To Abnormal Psychology**

- Criteria of normal and abnormal behaviour
- Defining Psychological Abnormality

### **Historical Background of Modern Abnormal Psychology**

- Ancient views and treatment
- Greek and Roman views (Europe in the middle ages)
- The Renaissance (19<sup>th</sup> century)
- Views of abnormality in the Indo-Pak subcontinent.

### **Models Of Psychopathology**

- Biological model
- Psychodynamic model
- Behavioural model
- Cognitive model
- Humanistic model
- Sociocultural model
- Eclectic approach

### **Introduction To Diagnostic Classification Systems**

- ICD – Past and current
- DSM – Past and current I, II, III, IV, IV – TR, 5

### **Schizophrenia Spectrum And Other Psychotic Disorders**

- Etiology

### **Bipolar And Related Disorders**

- Etiology

### **Depressive Disorders**

- Etiology

### **Anxiety Disorders**

- Etiology

### **Obsessive-Compulsive And Related Disorders**

- Etiology

### **Personality Disorders**

- Etiology

### **Somatic Symptom and Related Disorders**

- Somatic Symptom Disorder
- Illness Anxiety Disorder
- Conversion Disorder (Functional Neurological Symptom Disorder)
- Psychological Factors Affecting Other Medical Conditions
- Factitious Disorder
- Other Specified Somatic Symptom and Related Disorder
- Unspecified Somatic Symptom and Related Disorder
- **Etiology**

### **Dissociative Disorders**

- Dissociative Identity Disorder
- Dissociative Amnesia
- Depersonalization/Derealization Disorder
- Other Specified Dissociative Disorder
- Unspecified Dissociative Disorder

- Etiology

### **Reference Material**

- Alloy, L. B., Acocella, J., & Bootzin, R. R. (1996). *Abnormal psychology: Current perspectives*. USA: McGraw Hill, Inc.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4<sup>th</sup> ed.). Washington DC: APA.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5<sup>th</sup> ed.). Washington DC: APA.
- Comer, R.J. (2004). *Abnormal psychology*. USA: Freeman and Company.
- Davison, G. C., Neale, J. M., & Kring, A. M. (2004). *Abnormal psychology* (9<sup>th</sup> ed.). USA: John Wiley and Sons.
- Kaplan, H.I., Sadock, B.J., & Grebb, J. A. (1994). *Synopsis of psychiatry* (7<sup>th</sup> ed.). USA: Baltimore Williams and Wilkins.
- Davison, G. C., Neale, J. M., & Kring, A. M. (2004). *Abnormal Psychology*. 9<sup>th</sup> Edition. John Wiley & Sons, USA.
- Comer, R.J. (2004) *Abnormal Psychology*. Freeman and Company. USA.
- Alloy, L. B., Acocella, J., & Bootzin, R. R. (1996). *Abnormal Psychology: Current Perspectives*. McGraw Hill, Inc, USA.

## **SEMINARS IN ORGANIZATIONAL DEVELOPMENT**

### **Course Description**

**Organizational Behavior** is the study that investigates the impact that individuals, groups, and structure have on behavior within organizations, for the purpose of applying such knowledge toward improving the organization's effectiveness. As such, OB is concerned with the study of what people do in an organization and also the matters related to employee motivation, work groups, work teams, org structure, OD & change management. Organizational goals and objectives are achieved by the Managers with the help of other people. To perform their tasks successfully, today's Managers are faced with new challenges and they are required to be equipped with more than one skill; technical skills only are not enough; additional skills, including interpersonal skills and decision making skills are equally important

### **Course Content**

#### **Introduction to Organizational Behavior (OB)**

- Basic terms
- Managerial roles
- Managerial Skills
- OB & Supporting disciplines

#### **Citizenship Behavior**

#### **Diversity in Organizations**

- Biographical characteristics.
- Employee abilities.
- Shaping behavior of others.

Merits and challenges of diversity.

#### **Attitudes & Job Satisfaction**

- Components of attitudes
- Behavior Vs attitude

- Major job attitudes
- Measuring job satisfaction

Impact of satisfied and dissatisfied employees on work place

### **Emotions and Moods:**

- Basic emotions & moods
- Function of emotions
- Sources of emotions and moods
- Emotional labor
- Emotional Intelligence

Application of emotions

### **Personality and Values**

- Personality & its ingredients
- Myers-Briggs Type Indicators
- Big five personality models
- Traits relevant to OB
- Types of values
- Person - job & person – organization fit
- International values

Hofstede's cultural values

### **Perception & individual Decision Making**

- Perception & its factors
- Attribution theory and its determinants
- Common short-cuts/errors
- Perception Vs decision making
- Rational model, Bounded rationality and Intuition

Biases, errors & ethical considerations in decision making (DM)

### **Motivation (Concepts to application)**

- Job Characteristics model
- Redesigning the jobs
- Alternative work arrangements
- Social & physical context
- Employee involvement
- Variable pay programs
- Flexible pay plans

Recognition programs

### **Group Behavior**

- Group development models
- Role requirements change in different situations.
- Influence on an individual's behavior.
- Define *social loafing* and its effect on group performance.

Identify the benefits and disadvantages of cohesive groups.

### **Basic Motivation Theories**

- Motivation & its early theories
- Contemporary theories
- Model of organizational justice

Integration of theories

### **Team work**

- Contrast teams with groups.
- Types of teams.
- When teams are preferred over individuals.
- Characteristics of effective teams.
- Merits Vs demerits of diverse teams

Discussion on final project

### **Organizational Development & Stress Management**

- Change and its importance



- Sources of individual and organizational resistance to change.
- Lewin's three-step change model.
- Properties of innovative and learning organizations.
- Knowledge management and its importance.

Stress, its sources and ways to manage it.

### **Reference Material**

Course book:

Organizational Behavior, 15<sup>th</sup> Edition, (by Stephen P. Robbins).

1. Organizational Behavior, 8<sup>th</sup> Edition (by Fred Luthans)
2. Behavior in Organizations, 6<sup>th</sup> Edition (by Jerald Green Berg & Robert A. Baron)

## **SEMINARS IN HUMAN RESOURCE PLANNING**

### **Course Description**

- To describe the trends in labor force composition and how they impact human resource management practice.
- To discuss how to plan strategically for human resource needed to meet organizational goals and objectives
- To define the process of job analysis and discuss its importance as a foundation for human resource management practice.

### **Course Contents**

#### **Concepts of Strategy and Planning**

After attending the session student would be able to:

1. Discuss why managers need to examine the human resource implications of their organizational strategies.
2. Understand the various terms used to define strategy and its importance.
3. Describe organizational strategies, including restructuring, growth, and maintenance
4. Define business strategy and discuss how it differs from corporate strategy.
5. Discuss three approaches to business strategies: the Boston consulting group approach, the miles and snow approach, and porter's generic competitive strategies.

#### **Aligning HR with Strategy**

After attending the session student would be able to:

1. Understand the importance of strategic HR planning.
  2. Identify the risks associated with not planning.
  3. Discuss approaches to linking strategy and HR, including the barriers to becoming a strategic partner.
  4. List the characteristics of an effective HR strategy.
- Delineate the steps in the strategic HR planning model.

#### **Environmental Influences on HRM**

After attending the session student would be able to:

1. Identify the sources that HR planners use to keep current with business and HR trends.
2. List several of the methods-including trend analysis, the Delphi technique, and impact analyses-used to predict future trends.
3. Discuss the challenges in scanning the environment.
4. Delineate the environmental factors, such as the economic climate, the labor force, the political and regulatory context, and the social and cultural climate, the influence the practice of HRM.

5. Describe the role of the stakeholder, and list several examples

### **Understand how environmental scanning is practiced**

#### **Evaluation of HR Programs and Policies**

After attending the session student would be able to:

1. Understand the importance of measuring the effectiveness of HRM activities.
2. Outline five aspects of HRM that can be evaluated using the 5c model for the measuring effectiveness: compliance with laws and regulation, client satisfaction, cultural management to influence employee attitudes, cost control of the labor component of the budget, and the contribution of HR programs.
3. Discuss methods of measurements, such as cost-benefit analysis, utility analysis, and auditing techniques.
4. Identify the challenges in measuring HR activities.

#### **Job Analysis**

After attending the session student would be able to:

1. Understand the central role played by job analysis in all hr activities, and especially in the effective conduct of HR planning.
2. Comprehend the two essential elements of any job; method and time standard.
3. Explain common problems associates with the job analysis process.
4. Identify the five steps of job analysis process.
5. Employ criteria to select job analysis methods that are best suited to the organizational jobs being examined.
6. Develop analytical questions that will permit an in-depth examination of the knowledge, skills, abilities, and other attributes required for successful evaluation of jobs.

Analyze the advantages and disadvantages of the most common methods of job analysis.

#### **HR Management System**

After attending the session student would be able to:

1. Understand the critical importance of the HRMS to the HR planning process.
2. Appreciate the increasing complexity associated with the normal three stage evolution of HRMS.
3. Use selection and design criteria that will allow you to evaluate various HRMS as to their degree of fit with specific organizational configuration.
4. Evaluate specific data elements, which are inputs to the HRMS, and evaluate their utility based on selection criteria.
5. Comprehend the necessity for operating restrictions and safeguards on the access and usage of data contained in the HRMS.
6. Discuss the importance of various reports that can be develop as output formats from the HRMS, and evaluate their relative utility to a specific organization.

#### **The HR Forecasting Process**

After attending the session student would be able to:

1. Identify the three different categories of HR forecasting activity and their relationship to the HR planning process.
2. Understand the considerable advantages that accrue to organizations from instituting effective HR forecasting producers.
3. Discuss the rationale for giving special attention to specialist, technical and executive personnel groups in the HR forecasting process.

4. Comprehend the impact of environmental and organizational variables on the accuracy and time period or horizon of estimates derived from future estimates of HR demand and supply.
5. Identify the various stages in the process of determining net HR requirements.

### **Understand the policy and programs implications of an HR deficit or an HR surplus. HR Demand**

After attending the session student would be able to:

1. Understand the importance of demand forecasting the HR planning process.
2. Recognize the linkages between the HR plan, labor demand forecasting, techniques, and the subsequent supply stage.
3. Compare and contrast the advantages and disadvantages of various demands forecasting techniques: index/trend analysis, expert forecast, the Delphi technique, the nominal group technique, HR budgets (staffing or manning tables), envelops/scenario forecasting, and regression analysis

### **Ascertaining HR Supply**

After attending the session student would be able to:

1. Understand the relationship between demand and supply forecasting techniques in the HR planning process.
2. Recognize the importance of the HRMS in implementing effective supply forecasting producers.
3. Comprehend the critical relationship between supply forecasting and succession planning.
4. Discuss and evaluate the advantages and disadvantages of the following specific methods of determining external and internal supply of an organization's personnel:
  - a. Skills and management inventories.
  - b. Succession/ replacement analysis.
  - c. Markov models.
  - d. Linear programming.

### **Strategic International HRM**

After attending the session student would be able to:

1. Understand the definition of strategic international huma

### **Succession Management**

After attending the session student would be able to:

1. Understand why succession management is important.
2. Trace the evolution of succession management from its roots in replacement planning, comparing the two models with respect to focus, time, and talent pools.
3. List the steps in the succession management process.
4. Compare and contrast the job-based and competency-based approaches to aligning future needs with strategic objectives.
5. Discuss the four approaches to the identification of managerial talent.
6. Describe several ways to identify high-potential employees.
7. Evaluate the advantages and disadvantages of the five management development methods: promotions, job rotations, special assignments, formal training, and mentoring and coaching.
8. Recognize the difficulties in measuring the success of a management succession plan.
9. Be familiar with the employee's role in the succession management process.
10. Describe the limitations of succession management, and propose some possible solutions to these limitations resource management (SIHRM).
2. Realize the importance of international human resource management (IHRM) for the implementation of a firm's international strategies.

3. Recognize the significance of having a long-term career development plan for global managers, and of having the international assignment represent an important step in a broader plan of global competence development.
4. Recognize the kind of recruiting and selection techniques that might help to predict expatriate success.
5. Understand the rationale behind testing for expatriate trainability.
6. Recognize the various methods of cross-cultural training, as well as their advantages and disadvantages.
7. Be able to discuss the strategic issues involved in a compensating expatriate performance.
8. Recognize the potential opportunities of learning from repatriates.
9. Recognize critical strategic issues that may arise when employing labor from around the globe.

### **Downsizing and Restructuring**

After attending the session student would be able to:

1. Appreciate the importance of defining “downsizing.”
2. Be familiar with the complexity of the downsizing decision.
3. Recognize the need to address concerns of the both the victims and survivors of downsizing.
4. Be aware of the consequences of downsizing.
5. Understand what downsizing strategies are effective in enhancing organizational performance.
6. Comprehend the concepts of the “psychological contract.”
7. Develop an awareness of the importance of HRM in managing the downsizing process.

### **Mergers and Acquisition**

After attending the session student would be able to:

1. Understand the various the types of mergers and acquisition.
2. Explain why organizations merge and the methods used to achieve a merger.
3. Identify the financial and human impacts of mergers.
4. Describe the issues involved in blending cultures.
5. Discuss how a merger affects HR planning, selection, compensation, performance appraisal, training and development, and labor relations.

### **Outsourcing**

After attending the session student would be able to:

1. Define outsourcing.
2. List the reasons why organizations outsource functions and programs.
3. Identify the advantages of outsourcing.
4. Cite the risks and limitations of outsourcing.
5. Develop the criteria necessary for managing the outsourcing relationship.

### **Reference Material**

Strategic Human Resource Planning by Monica Belcourt & Kenneth J M<sup>c</sup> Bey, latest edition  
Strategic Human Resource Management by Mello, latest edition

## MS in Insurance and Risk Management, new launch Proposal

### The Case

1. MS in Insurance and Risk Management is futuristic program. This program will provide a new stream of research and value addition to the existing portfolio of academic degree program of BU. The program is being offered in some of the world renowned universities and few public universities in Pakistan. With the declining interest of students in MS (Finance) program, this program would provide an attractive alternative. Details are attached at Annexure.
2. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. Point was debated in the house in length. There is a consensus that before launching this program, there is a need to conduct market survey as it is important to ensure this course would attract significant number of students. Hence house recommended that market survey may be conducted before presenting the matter before the ACM.
3. The proposal to launch the new MS program in Insurance and Risk Management may be approved in the light of the house's opinion.

### Annexure

A. ACADEMIC DETAILS	
(1)	<b>Faculty / Institute / Department:</b> Departments of Management Sciences, Bahria University: Karachi, Lahore and Islamabad Campuses
(2)	<b>Name of the Program:</b> Master of Science in Insurance and Risk Management MS (I&RM)
(3)	<b>Duration:</b> 1.5 Years ( 3 Semesters)
(4)	<b>Venue (s):</b> Departments of Management Sciences, Bahria University at the three campuses as mentioned above
(5)	<b>Whether the proposed program will be offered in (morning/evening/weekend)?</b> Evening
(6)	<b>Number of <u>Extra</u> Faculty Member(s) or Skilled-Worker(s) Required?</b> (Write the faculty members and skilled-workers, fulltime/Visiting, required in <u>addition</u> to the existing strength, along with their qualifications) 6 Visiting Faculty
(7)	<b>Any <u>extra</u> class room(s) required? If yes, how many? And what will be their capacities required?(provide details)</b>  NO – Present classrooms are sufficient enough.
(8)	<b>Any <u>extra</u> laboratory/laboratories required? If yes, how many? And what <u>additional</u> equipment will be required?(provide details of equipment, use extra sheet if necessary)</b>  Nil: The Department has well established Research Labs that shall be used.
(9)	<b>Minimum Entry Level:</b>

	<ul style="list-style-type: none"> <li>16 years of education from HEC recognized educational universities / institutes, students with finance, marketing and public administration background.</li> <li>CGPA 2.50 or above in the final degree, on hand, if degree obtained from a CGPA based system.</li> <li>Minimum 50% marks if degree obtained from a non-CGPA program.</li> <li>Must pass Bahria University Admission Test.</li> </ul> <p style="text-align: center;">And / Or</p> <ul style="list-style-type: none"> <li>NTS-GAT General with 50 marks obtained in less than two years prior to admissions.(policies of HEC shall apply as amended from time to time)</li> </ul>
(10)	<b>Admission Criteria:</b> As per BU Policy
(11)	<b>Proposed Date of Commencement:</b> Fall 2016 (subject to approval of HEC)
(12)	<b>Mode of Study / Examination:</b> (Semester / Annual / Bi-Annual) Semester System
(13)	<b>Brief Description &amp; Rationale of the Program:</b> <ul style="list-style-type: none"> <li>Departments of Management Sciences, Bahria University are already running programs like MS (Fin), MS (SCM) and MS (PM). MS (Insurance and Risk Management) will add diversity to the studies.</li> <li>MS (I&amp;RM) has diversity in disciplines like management, finance and marketing etcetera. It is futuristic in industry / organization's requirements.</li> <li>The program has also been approved by Academic Council of the University.</li> <li>We plan offering this program in the evening sessions for the convenience of students.</li> </ul>
(14)	<b>Complete Plan of Studies:</b> <i>Departments of Management Sciences, BU will follow the approved Road Map of MS (I&amp;RM) (Attach complete roadmap with semester wise breakup)-attached</i>
(15)	<b>Course Outlines</b> (Attach course description for each course along with pre-requisite courses required) - attached
(16)	<b>Examination Policy:</b> We will follow the examination Policy Bahria University
(17)	<b>Number of Admissions Expected for First Intake:</b> 20-25 students
(18)	<b>Number of Admissions Planned/Expected for Subsequent Intakes:</b> 20 % increase every semester
(19)	<b>Date of Approval by the Board of Study?</b> <i>(Write the date. If approval is conditional, write all the conditions)</i> Already Done

B. FINANCIAL ANALYSIS	
(1)	<b>Any Agency (Public/Private) Funding this Program (Fully/Partially)?</b> <i>(Provide complete details including extent of funding and mode of disbursement)</i> NIL
(2)	<b>Expected Earning from First Intake:</b> 1.5 million (per semester)
(3)	<b>Projected Earnings for the Next Five Years:</b> 20 % increase per semester
(4)	<b>Total Estimated Salaries of all Extra Human Resources per Annum:</b> 1.2 million
(5)	<b>Cost of Extra Laboratory Equipment/Tools (if required):</b> NIL
(6)	<b>Cost of Extra Books for the Library: (if required):</b> Nil
(7)	<b>If the Venue is Hired, provide Annual Rental Expenses and Cost of other Fixtures:</b> NIL
(8)	<b>Miscellaneous Expenses Required for Starting the Program:</b> <i>(Write all expenses required for Furniture, Marketing, Advertisements, Prospectus-Printing etc.)</i>  Approximately Rs. 0.2 million per year for maintenance and upgrading classroom / research lab.

(9)	<b>Total Annual Recurring Expenditures Required in Subsequent Years:</b> (like Salaries, Advertisements, Stationeries etc) 1.4millions
<b>C. PROGRAMME VIABILITY</b>	
(1)	<b>Total Expenditures Required: Add B(4) to B(8)</b> ≈ Rs 1.4 million per semester
(2)	<b>Net Expenditures Required: Subtract B(1) from C(1)</b> ≈ Rs 1.4 million per semester
(3)	<b>Net Earnings in First Year: Subtract C(2) from B(2)</b> ≈ 0.1 million rupees
(4)	<b>Projected Annual Gross Earning in Subsequent Years:</b> ≈ + 0.2 million rupees per annum , will differ with intake
(5)	<b>Projected Annual Net Earning in Subsequent Years:</b> <b>Subtract B(9) from C(4)</b> The program shall become more profitable in coming years.

## Road Map for MS in Insurance and Risk Management

Bahria University is one of the leading universities of the country. It has signed agreements / MOUs with over 20 universities around the world and the number is growing. There has been repeated exchange of programs and exchange of students among these educational institutes. Bahria University is also committed in providing International Certifications to its students that improves international acceptability and credibility of its students / alumni.

Having ventured in multiple disciplines, the university has planned launching a new programme as MS in Insurance and Risk Management. The course contents of the programme as listed below are the ones most suited in the current local and international market scenario. These course contents and the subjects offered may change over a period of time based on Bahria University collaboration with other notable institutes / organizations / International Certifications providers locally and worldwide. However the duration of the degree and the number of courses offered (18-months and 30-credit hours) will stay in line with the policies of Higher Education Commission of Pakistan.

Semester-wise details of the courses offered are attached below:

### Semester-1

Serial	Course Title	Level	Credit Hours
1	Insurance Principles and Practices	Core	3
2	Quantitative Decision Making	Core	3
3	Essential Skills for Insurance Broker and Agent	Core	3
4	Elective (800 Levels)	Elective	3

### Semester-2

Serial	Course Title	Level	Credit Hours
1	Risk Management and Insurance	Core	3
2	Elective (800 Levels)	Elective	3
3	Elective (800 Levels)	Elective	3
4	Elective (800 Levels)	Elective	3

### Semester-3

Serial	Course Title	Credit Hours
1	Supervised Research	6

2	Supervised Research	In various phases of research as per progress of the studies
3	Supervised Research	
4	Supervised Research	
	Total	6

**List of Electives:** The list is as given below. It provides areas for academic pursuits covering finance, marketing and management.

Serial	Course Title	Credit Hours
1	Automobile and Property Insurance	3
2	Essentials of Loss Adjusting	3
3	Underwriting Essentials	3
4	Compliance and Regulations of Insurance Companies	3
5	Contemporary Issues in Insurance and Risk Management: Concepts and Applications	3
6	Financial Institutions' Management	3
7	Property/Liability Insurance Control Analysis	3
8	International Business and Economic Perspectives	3
9	International Risk Management: Perspective under Globalization	3
10	Alternative Risk Financing	3
11	International Business and Economic Perspectives	3

## **COURSES OUTLINES**

### **IRM- : Financial Institutions Management**

#### **Course Description**

This course provides an introduction to the management of financial institutions and intermediaries. The course focuses on the importance of ensuring good organizational functioning within institutions to manage the varied types of risk that they may be exposed to. Students are first introduced to the construct of the firm as a legal entity, and how financial institutions have specific requirements that relate to this. The course then examines the principles of the theory and practice of effective organizational structure and policies for successful risk management and how to manage the inter-relationships that are inherent between departments. Students are also introduced to international standards of banking practice and how they impact the functioning of the institutions plus how to define and measure various types of risk these institutions can be exposed to.

#### **Course Contents**

##### **Introduction:**

- Overview of Financial Institutions
- Depository Institutions
- Non Depository Institutions

##### **Measuring Financial Performance:**

- Financial Statement Analysis
- Concepts of Risk Management

##### **Measuring Risk Exposure:**

- Interest Rate Risk (Maturity Model)



- Interest Rate Risk (Duration & Reprising Models)

### **Measuring Risk Exposure:**

- Interest Rate Risk (Maturity Model)
- Interest Rate Risk (Duration & Reprising Models)
- Credit Risk
- Market Risk
- Foreign Exchange Risk
- Liquidity Risk

### **Managing Risk:**

- Liquidity And Liquidity Management
- Capital Adequacy
- Securitisation

### **Books**

- Lange, H., A. Saunders, M.M. Cornett (LSC), “Financial Institutions Management”, Third Edition, McGraw Hill/Irwin ( 2012).
- Crouhy, M., D. Galai and R. Mark., “ The Essentials of Risk Management” MGrav Hill (2006)
- Saunders, J. M.M. Cornett “Financial Institutions Management, 6th edition McGraw Hill/Irwin (2008)

## **IRM- : Property / Liability Control Analysis**

### **Course Description**

This course examines the identification and management of risks arising from property and legal liability. The primary focus is on the treatment of commercial loss exposures. Commercial exposures will be examined broadly to apply not only to business risks, but also to the treatment of risk in non-profit organizations, governmental organizations and other organizations. The course has three interrelated objectives. The first is to strengthen the student’s ability to make effective risk decisions, guided by the risk management methodology. The second task is to deepen understanding of commercial loss exposures. The third is to develop stronger working knowledge of the major commercial insurance contracts and their use in covering property and liability exposures.

### **Course Contents**

#### **Insurance and Risk:**

- Definition of Risk
- Key Terms: Loss Exposure, Chance of Loss, Peril And Hazard
- Classification of Risk
- Major Personal and Commercial Risk Exposure
- Definition of Insurance; Characteristics of Insurable Risk
- Adverse Selection
- Types of Insurance

#### **Legal Principles Fundamental to Insurance Contracts:**

- Principles of Indemnity
- Principle of Insurable Interest
- Principle of Subrogation
- Principle of Utmost Good Faith
- Requirement of an Insurance Contract
- Distinct Legal Characteristics of a Legal Contract
- Law and the insurance agent

**Analysis of Insurance Contract:**

- Basic part of an insurance contracts
- Definition of Insured
- Endorsements and Riders
- Deductibles
- Coinsurance
- Coinsurance in Health Insurance
- Other Insurance Provisions

**The Liability Risk:**

- Basis of legal liability
- Law of Negligence
- Imputed Negligence
- Specific Applications of the Law of Negligence
- Current Tort Liability Problems

**Auto Insurance:**

- Overview of Personal Auto Policy
- Liability Coverage
- Medical Payments Coverage
- Uninsured Motorists coverage
- Damage to Your Auto
- Duties After an Accident or Loss
- General Provisions

**Commercial Property Insurance:**

- ISO Commercial Property Program (Self Contained Vs Modular Policies)
- Commercial Package Policy
- Building and Personal Property Form
- Cause of Loss Forms
- Reporting Forms
- Business Income Insurance
- Other Commercial Property Coverage
- Inland Marine
- Business Owners

**Commercial Liability Insurance:**

- General Liability Exposures
- Commercial General Liability Policy
- History of Workers Compensation
- Workers Compensation and Employers Liability Policy
- Business Auto Policy
- Commercial Umbrella Policy
- Professional Liability Insurance (Errors & Omissions, Directors and Officers)

**Books:**

- George E. Rejda, "Principles of Risk Management and Insurance", Twelfth Edition, Pearson (2014).
- Jhon H. Mathias, Jr., John D. Shugrue, Thomas A. Marrinson, "Insurance Coverage Disputes", Volume 1, Law Journal Press (1996)

- Robert E. Frankel, John N. Ellison , “Insuring Real Property Business”, Third Edition, Looseleaf (2007).

## **IRM- : International Risk Management: Perspective Under Globalization**

### **Course Description**

In a rapidly changing global world, with decreasing product life cycles and increasing customer and societal expectations placed upon businesses, there are significant and increased risks that have the potential to imperil value creation by businesses. In this world, value is put at risk - by competition, or failures of corporate leadership, strategies, processes and operating capabilities. Developing effective ways of managing such Business Risks is proving to be a central agenda item for organizations seeking continuing success. This course addresses this emergent field conceptually, technically and speculatively by examining the tools, techniques and approaches used to identify measure and manage business risks which are designed to enable managers to create value in the face of the ever changing environment confronting them. The course makes extensive use of case studies and research reports.

### **Course Contents**

#### **Value, Risk and Culture and Organization Frameworks**

- Defining and Classifying Risk
- The Evolution of Business Risk
- The Role of Risk Management in Business Organizations and their environment
- Resource dependency & value creation
- Organizational functioning in response to risk

#### **The Risk Management Process – Identifying Risk, & Risk Management Philosophies and Strategies**

- Risk Identification and the types of risks
- The Risk Management Process
- Accepting, avoiding and sharing risk
- Establishing Risk Management frameworks

#### **Crisis Management and Contingency Planning**

- Can crises be avoided?
- Contingency Planning for crises
- The tactics of Crisis Management, what to do when risk management fails
- Profiting from Crises

#### **The Risk Management Process – The Theory of Measuring Risk**

- Risk Measurement Systems
- Risk and Regret
- The Risk & Return relationship
- Statistics Refresher
- Calculating Value at Risk

#### **Capital at Risk and Performance Measurement**

- Analyzing the segments of the value at risk distribution
- Assessing Capital at Risk and Earnings at Risk
- Calculating Return on Risk Adjusted Capital (RAROC)
- Analysis of Risk Adjusted Performance Measures

#### **Risk and Strategy under Uncertainty**

- The shortcomings of traditional strategic evaluation techniques

- Assessing the level of uncertainty confronting organizations
- Developing strategic responses to risk
- Matching strategy with organizational capability

### **Risk and Strategy**

- The use of real options in strategy formulation and valuation
- The significance of implementation in strategic risk management

### **Control Systems and the Management of Risk**

- The nature and structure of control systems
- The levers of control within an organization
- Control structures and risk management

### **Corporate Governance – Where the rubber meets the Road**

- What is corporate governance?
- Senior management and the role of the CFO
- Individual and organizational influences on decision making and behavior
- Risk management and the shareholder value

### **Fraud Risks**

- The role of insurance
- Hedging activities
- Risk management strategies
  - Fraud
  - People Risks

### **Environmental Risks**

- Environmental risk and its impact on firms
- Should Environmental Risk be avoided or can it be managed?
- Can firms profit from the management of Environmental Risk

### **Books**

- Borge D, “The Book of Risk”, John Wiley and Sons (2001).
- Sadgrove K, “The Complete Guide to Business Risk Management”, Gower (2010)
- Donaldson L, “Performance Driven Organizational Change”, Sage Publications (1999)

## **IRM- : Alternative Risk Financing**

### **Course Description**

Introduction to the classification of risk and the basic principles of diversification and hedging, optimal portfolio choice. This will include an overview of the Capital Asset Pricing Model, which is widely applied for the equilibrium pricing of risks.

Then, the methods to manage market risk for fixed income and equity portfolios.

Students will learn about Value at Risk (VaR) and its applications to risk management practices.

Next, the concept of endogenous risks to demonstrate how financial risks originate within the financial system. It highlights behavioral aspects of risk and discuss important limitations of current risk management practices.

Finally, to credit risk, with a focus on ratings based and structural models. It also covers credit risk on portfolios and credit derivatives.

### **Course Contents**

- Foundations of risk measurement and risk finance theory.
- Basic risk management instruments: Forwards, futures, swaps and options.
- Market risk management: Methods for hedging risk in equity and fixed income portfolios; Delta and Gamma, Duration and Convexity.
- Value-at-Risk: Definition, implementation and evaluation of risk forecasts. Alternative risk measures.
- Credit risk: Merton model, the KMV approach, and ratings based models.
- Introduction to credit derivatives and mortgage-backed securities.
- Limitations and failures of risk models.
- Endogenous risk.
- Some ideas from behavioral finance: noise trader risk, limits to arbitrage, bubbles.
- The impact of the credit crisis and its implications for risk management and regulation.

### **Books**

- J. Hull, “Risk Management and Financial Institutions”, Fourth Edition John Wiley and Sons (2015).
- Christopher L. Culp, “The art of risk management: Alternative risk transfer, Capital Structure and the convergence of insurance and capital markets”, John Wiley and Sons (2002)

## **IRM- : Contemporary Issues in Insurance and Risk Management: Concepts and Applications**

### **Course Description**

The course covers the risks that are faced by an individual or firm and the various methods for their treatment. Methods of treatment include, but are not limited to, insurance, loss prevention, surety ship, simple retention, and self-insurance. Topics include personal and business insurance.

### **Course Contents**

- Types of Risk, adverse effect of risk on economic activity
- Statistical Principles of Insurance and situations where insurance used as a risk sharing or risk transfer device
- Differentiate between private and social insurance
- Unique facets of an insurance company and its financial operations
- Principles of contract law and are peculiar to insurance
- Available innovative life policies, endowment and term insurance.
- Annuity contract and uses of it today
- Need and provision of disability income insurance
- Workers Compensation and Unemployment Compensation programs
- Concept of Estate planning and tools for minimizing the estate shrinkage
- Concepts of negligence and identify the methods of dealing with legal liability
- Need for automobile insurance and computation of auto insurance costs
- Government functions as an insurer
- Identify the need for regulation of the insurance industry, explain the methods by which the industry is currently regulated, and discuss proposals for future regulation
- Understand surety ship

### **Books**

- Rejda, George E., and Michael J. McNamara, “Principles of Risk Management and Insurance”, Twelfth Edition (2014).

- Scott E. Hurrington and Gregory R. Niehaus, “Risk Management and Insurance”, Second Edition, McGraw- Hill (2003)

## **IRM- : International Business and Economic Perspective**

### **Course Description**

Students conduct an integrative and comprehensive overview of the fundamental issues and challenges that confront the international firm. Topics include globalization and international linkages; public, legal, and technological environments; meaning and dimensions of culture; organizational culture and diversity; cross-cultural communication and negotiation; strategy formulation and implementation; entry strategies and organizational structures; managing political risk, government relations, and alliances; management decision and control; and motivation, leadership, human resource selection, and development across cultures.

### **Course Contents**

#### **Globalization and International Linkages**

- Globalization and Internationalization, Anti- globalization and regional integration
- Shifting balance of economic power in the global economy
- Global economic systems: market, command and mixed economy
- Economic performance and issues of major regions in the established and emerging economies.

#### **The Public, Legal and Technological Environment**

- Political environment, ideologies Socialism Political environment political systems
- Legal and regulatory environment, International law, trade and investment
- Technological environment: trends and global shifts in production

#### **Organizational Culture and Diversity**

- Nature of organizational culture
- Interaction between national and organizational cultures
- Managing multiculturalism and diversity

#### **Cross culture communication and negotiation**

- Communication process, styles, flows, barriers
- Achieving communication effectiveness
- Managing cross culture negotiations

#### **Strategy Formulation and Implementation**

- Strategic management
- Basic steps in formulating strategy
- Strategy implementation and specialized strategies

#### **Entry Strategies and Organizational Structures**

- Export/Import, subsidiaries, mergers and acquisitions, alliances and joint ventures, Licensing and Franchising.
- Basic and non-traditional organizational structures
- Organizational Characteristics of multinational corporations

## **Managing Political Risk, Government Relations, and Alliances**

- Nature and analysis of political risk
- Managing political risk and government relations
- Managing alliances

## **Management Decision and Control**

- Decision-making process and challenges
- Decision and control linkages
- Performance evaluation as a mechanism of control

## **Motivation across Cultures**

- Nature of motivation
- International findings on Maslow's, Herzberg's and achievement theories
- Select process theories
- Motivation applied: Job Design, work centrality and rewards.
- Incentives and culture

## **Leadership across Cultures**

- Foundation for Leadership
- Leadership in the international context
- Recent findings and insights about leadership

## **Human Resource Selection and Development across Cultures**

- Importance of international human resource
- Sources of human resources
- Selection criteria for international assignments
- International human resource selection procedures

## **Books**

- Luthans, F., & Doh, J. P., "International Management: Culture, Strategy and Behavior", Mc Graw Hill Irwin (2011).

## **IRM- : Compliance & Regulations of Insurance Companies**

### **Course Description**

The course will discuss the compliance function in a life insurance company including underwriting, claims, reinsurance, market analysis & examinations and how the government regulate life insurance companies and annuity product design.

### **Course Contents**

- Compliance and Legal
- Life Insurance
- Marketing and Business Acquisition
- Operations and Administration

### **Recommended sources**

- A Guide to Insurance: Combining Governance, Compliance and Regulation 1st Edition, by Nigel Feetham & Robin Amos
- Compliance Officer's Handbook by John Virgo

- Insurance for Dummies, 2nd Edition, by Jack Hungelmann
- Wiley Journal: Risk Management and Insurance Review
- Journal of Risk and Insurance

## **IRM- : Essentials of Loss Adjusting**

### **Course Description**

The core of this course is the knowledge of insurance and professional conduct within the claims domain. Soft skills and knowledge required to handle claims are blended in the curriculum in order to improve fundamental claims handling techniques.

Managing relationships will be taught in order to gather critical information in the claims handling process. A step-by-step process delivers the key to policy analysis for coverage evaluations. The fundamentals of investigation, evaluation, negotiation, and settlement within the claims process will be taught. Specific introductory claims knowledge will be covered in the context of automobile, property, and liability claims.

### **Course Contents**

- Legal and corporate environments
- Policy contract analysis
- Communication skills
- Investigation, evaluation, negotiation, and settlement
- Automobile, Property, and Liability Claims

### **Recommended Sources**

- Essentials of loss adjusting. By Shawn Brown; Insurance Institute of Canada.
- Adjustment of Property Losses. By Paul I. Thomas
- Property Loss Adjusting (Vol 2), 2nd Edition, by James J. Markham (Editor), Insurance Institute of America (Corporate Author)
- How to Estimate Building Losses and Construction Costs. By Paul I. Thomas
- Insurance for Dummies, 2nd Edition, by Jack Hungelmann
- Wiley Journal: Risk Management and Insurance Review
- Journal of Risk and Insurance

## **IRM- : Automobile & Property Insurance**

### **Course Description**

This will include a detailed study of automobile insurance. It will deal with legislation related to automobile insurance and policies and regulations, concentrating mostly on personal coverages. Owner's Policies or coverages specific will be handled in detail.

This course also provides an overview of building construction terminology, how a house is built, building materials used, repair methods, and estimating methods. Learn about the more common types of building damage and how to go about evaluating the cost of repair.

### **Course Contents**

- Introduction and development of automobile insurance
- Third-party liability
- Accident benefits
- Uninsured motorist coverage
- General provisions, definitions, and exclusions
- Statutory conditions,
- Loss of or damage to the insured automobile
- Endorsements
- Applications for automobile insurance; Underwriting
- Industry programs for insurance availability
- Construction and repair terminology
- Structural types



- Damageability and repairability

### **Recommended sources**

- Understanding Personal Auto Insurance, By Sheryl Lilke
- Property Insurance Law and Claims, By Walmsley, R M
- Insurance for Dummies, 2nd Edition, by Jack Hungelmann
- Wiley Journal: Risk Management and Insurance Review
- Journal of Risk and Insurance

## **IRM- : Risk Management & Insurance**

### **Course Description**

The course covers the risks that are faced by an individual or firm and the various methods for their treatment. Methods of treatment include, but are not limited to, insurance, loss prevention, suretyship, self retention, and self-insurance. Topics include personal and business insurance.

### **Course Contents**

- types of risks, hazards and perils, and the adverse effect of risk on economic activity
- the basic statistical principles of insurance and the situations where insurance may be used as a risk-sharing or risk-transfer device
- private and social insurance and the needs for each
- the structure of the insurance industry and the unique facets of an insurance company, including its financial operations
- the general principles of contract law with a particular emphasis on those principles that are peculiar to insurance
- the traditional forms of whole life, endowment, and term insurance, as well as some of the innovative life policies, which are now available
- the annuity contract and understand the various uses of annuities today
- the need for disability income insurance and the provisions of the disability income policy
- the various types and appropriate uses of medical expense insurance contract
- the concept of the Social Security system, including the coverage it provides, the soundness of the program, and proposals for future changes
- the Workers Compensation and Unemployment Compensation programs
- the concept of estate planning and discuss the various tools, which are used to minimize estate shrinkage
- the unique characteristics of group insurance and identify the types of group insurance most frequently used
- the nature of pension plans and other retirement plans and outline the requirements for pension plans established
- the concept of property insurance with a particular emphasis on the various forms of Homeowners and Inland Marine insurance policies
- the legal concepts of negligence and identify methods of dealing with legal liability
- the nature and need for automobile insurance, the types of automobile coverage, and a review of the computation of auto insurance costs
- commercial property and liability coverages available for businesses
- the principles behind surety and fidelity bonding
- government functions as an insurer
- the need for regulation of the insurance industry, explain the methods by which the industry is currently regulated, and discuss proposals of future regulation
- suretyship

### **Recommended sources**

- Wiley Journal: Risk Management and Insurance Review
- Journal of Risk and Insurance
- Value and Capital Management: A Handbook for the Finance and Risk Functions of Financial Institutions by Thomas C. Wilson

## **IRM- : Essential Skills for Insurance Broker & Agent**

### **Course Description**

This course provides an overview of insurance business practices from the broker's perspective and begins by introducing the broker as an insurance intermediary. Students will learn the needs of personal lines clients and small commercial risks and the skills that typical broker will use to perform effectively. Students will follow the progress of a risk from initial contact with the client through the evaluation and application process, to binding and policy documents. Major product lines and common policy transactions handled by brokers will be reviewed.

### **Course Contents**

- The Role of Insurance Intermediary
- Overview of Broker "Soft" Skills
- Practical Risk Analysis
- Completing the Application
- CIP Exam Registration
- From Binder to Policy
- Analyzing Risks and Coverage: Property
- Analyzing Risks and Coverage: Automobile
- Analyzing Risks and Coverage: Liability
- Overview of Common Insurance Transactions
- Broker's Role in Claims Process
- Licensing and RIBO

### **Recommended Sources**

- Essential Skills for the Insurance Broker and Agent. Insurance Institute of Canada
- A Reference/Resource Guide is also available from the Insurance Institute of Canada

## **IRM- : Quantitative Decision Making**

### **Course Description**

This course covers concepts and tools that aid managerial decisionmaking by applying scientific approach and computer software to managerial problems that involve quantitative factors. Modeling of such operational situations is emphasized through cases and spreadsheet exercises.

Given today's digital revolution in data capture, the focus of this course will be on building a better understanding of the statistical tools for displaying and analyzing business data. The management competency at the heart of the course is known as statistical thinking. A manager with a high competency in statistical thinking understands how and why business performance varies. The same manager allows the 'data to speak' and makes decisions based on a thorough examination of the available data. The business benefit is that the risk of unsatisfactory outcomes is reduced and a greater insight on how to improve the business is achieved.

### **Course Contents**

- Students will become familiar with terminology, basic tools and concepts of management science and scientific approach to decision making, as well as the current software in the area, to be able to communicate with analysts and other experts in the field.

- Students will become proficient in techniques of analyzing real-world operational situations using spreadsheet software.
- Students will develop an understanding of how to interpret the results of the quantitative and computational analysis of a decision problem.
- Students will be able to construct and analyze decision trees for business decision making.
- Students will gain an appreciation of the importance of project management and become proficient in using software in project scheduling.
- Students will gain an appreciation for the relevance and power of quantitative tools for managerial decision making.
- Students will refine their analytical thinking skills.
- Students will develop an understanding of what decision technologies can and cannot do in support of decision making in business.

### **Recommended sources**

- Hillier, F. S. and M. S. Hillier, Introduction to Management Science, Second Edition, Irwin McGraw-Hill, 2003.
- Taylor, A. J. Hamish, Excel Essentials using Microsoft Excel for Data Analysis and Decision Making, CD-ROM, Thomson, Brooks/Cole, 2002.
- the StatTools™ software (<http://www.palisade.com/stattools>), an Excel add-in
- A Microsoft Windows compatible PC (preferably a laptop in face-to-face classes).
- Windows 7 and Windows 8 are compatible and recommended.
- Excel 2003 or later (preferably Excel 2007 or later).
- Internet access.

## **IRM- : Insurance Principles & Practices**

### **Course Description**

The course will involve organizations, mostly the insurance industry.

The course contents consist of the nature of insurance, principles and practice of insurance and the need for the practice of insurance. Insurance companies are risk takers. They accept risks transferred to them by individuals, corporate bodies, government and their agencies/corporation.

Re-insurance companies: As individuals purchase insurance from insurance companies, insurance companies also purchase insurance from re-insurance companies.

The aims of this course are to further expose you to the nature and principle and practice of insurance, the contributors to these principles as well as the various approaches to insurance. Due to the importance of authority and communication in the practice of insurance the course is aimed at making you have greater appreciation of these two areas.

The aims will be achieved by: explaining the nature of insurance, identifying the functions of insurance, highlighting the importance of insurance, describing the various approaches to insurance, explaining the major contributors to the insurance industry, defining risk and insurance, identifying the insurance market and intermediaries and their functions.

### **Course Contents**

- Introduction to Insurance
- Classes of Non-Life Insurance Business
- Classes of Life Insurance
- General Principles of Insurance
- Principles of Insurance
- Principles of Utmost Good Cause
- The Principle of Proximate Cause
- The Principle of Indemnity
- The Principle of Subrogation
- The Principle of Contribution

- Insurance Documentation
- General Principle of Underwriting and Rating
- Renewal and Cancellation
- Making a Claim
- Risk Management

### **Recommended sources**

- Stochastic Processes for Insurance and Finance by Tomasz Rolski, Hanspeter Schmidli, V. Schmidt, Jozef Teugels
- Introductory Stochastic Analysis for Finance and Insurance by X. Sheldon Lin, Society of Actuaries
- Accounting, Auditing and Governance for Takaful Operations by Sheila Nu Nu Htay, Mohamed Arif, Younes Soualhi, Hanna Rabittah Zaharin, Ibrahim Shaugee
- An Introduction to Islamic Finance: Theory and Practice, 2nd Edition, by Zamir Iqbal, Abbas Mirakhor

## **Launch of Weekend MS EE and MS ENGG Management Program**

### **The Case**

1. EE Department Bahria University Karachi Campus is offering MSEE program since Fall 2011 with four different specializations.
2. There is an increased demand for MSEE weekend program from students who cannot spare themselves on week days.
3. MS Engg Management is already approved in BUIC. EE department BUKC is also keenly interested to offer new program in evening or week end. The agenda is tabled for principle approval of the ACM.

### **Recommendation**

4. Principle approval is requested to start these programs.

## PhD Psychology-Launch Proposal

### The Case

1. Department of Professional Psychology was established in Fall 2014 with the launch of MS in Clinical Psychology with initiation and persistent guidance of Director IPP (BUKC). With the successful launch of above said program, launch of PhD in Clinical Psychology. The PhD programs at Higher Education Institutions (HEIs) play an important role in determining their research status and hence the ranking. Furthermore, Doctoral degree with specialization in Clinical Psychology is not being offered in Islamabad and Rawalpindi, while MS program in same field is relatively available in different universities, hence enhances the chances of reasonable enrollment. At present, the Department of Professional Psychology at Islamabad Campus is running MS degree programs in Clinical Psychology with 57 students enrolled. Keeping in view the matured MS programs, the department plans to start the PhD programs in Clinical Psychology. Considering above mentioned factors and encouraging trends, the program is intended to be launched in spring 2016.

2. Psychology has been a subject of immense interest due to its relation to human nature and behavior. With the advancement in the field, several disciplines have been introduced in addition to revolutionarily advanced conceptual frameworks of understanding into human behavior. Befitting the present scenario of advanced societal and environmental influences, psychology is becoming inevitable demand to attempt to understand, explain and offer intervention modalities to individuals. Every field of human functioning, psychology brings in-depth analysis and solutions to complex issues in addition to placing emphasis on possible utmost improvement. Despite its efficacy in advanced fields as career in clinical, organizational, educational and forensic domains, the basics of psychology serve to enlighten the person by providing insight and knowledge in fundamentals of human functioning in multidimensional context. Clinical Psychology is considered as most important domain of Psychology with respect to its originality and specialization in understanding and providing treatment to different mental conditions. The trained professionals can impart their role more authentically having sound engrossment in related knowledge, since this is matter of human mind that is a sensitive demeanor as a profession.

### Recommendations:

3. On the basis of initial analysis of trends and existing market of Psychology, it is being recommended that PhD in Clinical Psychology may be commenced from Fall 2016 as an evening program. Following suggestions may please be considered and approved.

4. Once a year intake of per year i.e 05 students may be taken initially, however with the development of department in terms of faculty and other requirements, more students' intake may be considered.

5. Program may please be started as an evening program.

### Human Resource (HR) Requirements

6. The program may be started with an induction of a PhD faculty (As per HEC criteria, there is shortage of 01 PhD faculty) since HEC placement, which was being awaited seems unavailable due to some degree attestation reasons. Department of Professional Psychology however we may need more permanent teaching faculty in spring – 2017

## Infrastructure and other Requirements

7. **Classroom Requirement.** Initially, there is requirement of one classroom in the evening.
8. **Other Requirements.** Will be submitted soon

### Feasibility

#### **PhD (Clinical Psychology)**

Department of Professional Psychology  
Bahria University, Islamabad Campus

(A) Academic details	
(1)	<b>Faculty /institute /department</b> Department of Professional Psychology
(2)	<b>Name of program :</b> PhD (Clinical Psychology)
(3)	<b>Duration :</b> 3-5 years (10 Semester)
(4)	<b>Venus(s):</b> Islamabad Campus
(5)	<b>Whether the proposed program will be offered in (morning/evening/weekend)?:</b> Evening
(6)	<b>Number of <u>Extra</u> Faculty Member(s) or skilled-worker(s) Required? : Yes</b> At least 01 permanent PhD faculty member is to be inducted to fulfill the minimum criterion to launch a PhD program as per HEC. The program will be offered in the evening. Administrative staff will perform their task in the evening as an additional duties as per BU rules.
(7)	<b>Any <u>extra</u> class room(s) required? If yes, how many? and what will be their capacities required?(provide details) NO</b> The existing room, allocated to BS Psychology program in the morning session will be utilized in the evening for PhD classes.
(8)	<b>Any <u>extra</u> laboratory /laboratories required? If yes, how many? And what <u>additional</u> equipment's will be required? (provide detail of equipment's ,use extra sheet if necessary): Yes</b> The details are as follows <ul style="list-style-type: none"><li>• Along with the existing resources available in the department, lab facilities need to be extended by addition of more Psychological tests (Flag A)</li><li>• Furthermore, a permanent and convenient internship site needs to be available for internship since the students have to complete 500 hours of internship. Hence MOU with some hospital is required to be signed on permanent basis.</li><li>• Additional books (reference/recommended) are also required to be added in library resources (Flag B)</li></ul>
(9)	<b>Minimum Entry level :</b> 18 years of education in the relevant field
(10)	<b>Admission criteria :</b> 3.00/400 CGPA in MS program with Subject GAT/University Test Prior to admission
(11)	<b>Proposed date of Commencement :</b> Fall 2016
(12)	<b>Mode of study/Examination:</b> Semester System
(13)	<b>Brief Description &amp; Rationale of program:</b> The PhD programs at Higher Education Institutions (HEIs) play an important role in determining their research status and hence the ranking. Furthermore, Doctoral degree with specialization in Clinical Psychology is not being offered in Islamabad and Rawalpindi, while MS program in same field is relatively available in different universities, hence enhances the chances of reasonable enrollment. At present, the Department of Professional Psychology at Islamabad Campus is running MS degree programs in Clinical Psychology with 57 students enrolled. Keeping in view the matured MS programs, the department plans to start the PhD programs in Clinical Psychology.

(14)	<b>Complete Plan of studies</b> (Attach complete roadmap with semester/year wise backup ) Attached at Flag-C
(15)	<b>Course Outlines</b> (Attach course description for each course along with pre-requisite course required and recommended book ) Attached at Flag –D
(16)	<b>Examination Policy</b> (Attach separate sheet to provide the following details) As per BU rules for PG Programs.
(17)	<b>Number of admission expected for first intake: 5</b>
(18)	<b>Number of Admission Planned/Expected for Subsequent Intake: 5 students per year</b>
(19)	<b>Date of approval by the board of study?</b> (Write the date. If approval is conditional, write all conditions ) Faculty Board of Studies (Management and Social Sciences) – 8 <sup>th</sup> March, 2016 Approval was granted on following two conditions 1. Lab extension 2. Internship site

<b>(B) Financial Analysis:</b>	
(1)	<b>Any Agency (Public/private) Funding this Program (Fully/Partially)?:</b> No
(2)	<b>Expected Earning from First Intake :</b> Details Attached at Flag-E
(3)	<b>Projected Earnings for the Next Four Years:</b> Details Attached at Flag-F
(4)	<b>Total Estimated Salaries of Visiting Faculty Members per Annum:</b>  Details Attached at Flag-G
(5)	<b>Cost of <u>Extra</u> Laboratory Equipment/tools(if required):</b> Details Attached at Flag-H
(6)	<b>Cost of <u>Extra</u> Books for the Library (if required):</b>
(7)	<b>If the Venue is hired provide Annual Rental Expenses and Cost of other Fixtures:</b> Nil
(8)	<b>Miscellaneous Expenses Required for starting the program :</b> Nil
(9)	<b>Total Annual Recurring Expenditures Required in Subsequent Year(like Salaries ,Advertisements, Stationeries etc)</b> Flag-C



## **COMMENCEMENT OF BS PSYCHOLOGY PROGRAM AT LAHORE CAMPUS**

### **INTRODUCTION**

1. The Institute of Professional Psychology located at Karachi Campus is currently offering graduate and undergraduate level programs in professional disciplines of Psychology including Clinical, Educational and Organizational Psychology. The various programs offered are:

- a. BS Psychology
- b. Post Magistral Diploma (PMD) - Professional Psychology
- c. M Phil / MSc- Professional Psychology
- d. PhD – Professional Psychology

2. Professional Psychology Department at Islamabad Campus was established in the year 2014 and presently Master of Science in Clinical Psychology Program is offered.

3. It was desired vide letter reference Registrar Office Order No. 45/2015 dated, 03 September 2015, to carry out study for launching the Professional Psychology program at Lahore Campus. The study is to take in consideration the rationales/ objectives of launching the program, target market, material and human resources requirement, infrastructure/physical & material support to impart practical training to students and approximate financial effects. In this respect Director IPP was directed to forward an all-encompassing 'Feasibility Report' to Bahria University Headquarters for further evaluation and to adopt future line of action.

### **AIM**

4. The aim of the concept paper is to evaluate the subject proposal in totality with all its pros and cons and present the most suitable and viable solution for launching the Professional Psychology Department at Bahria University Lahore Campus.

### **RATIONALES FOR LAUNCHING PROFESSIONAL PSYCHOLOGY PROGRAM AT LAHORE CAMPUS**

5. Following facts would elaborate the rationales for launching Professional Psychology program at Lahore Campus:

- a. To bridge the highly disproportionate gap between "Demand" and "Supply"; the ratio of practitioner to clients is appalling with 170 million people covered by just over 1500 psychiatrist and 2000 to 3000 practicing psychologists. These practitioners are limited to 6 cities only as such 80% of the population has no mental health cover at all.
- b. There is dire need to increase the availability of clinical and professional services for the people of Pakistan. Severely increasing economic and social injustice has caused violence, depression and severe stress. The current suicide bombings and economics meltdown further exacerbates an already dysfunctional environment.
- c. Universities are recognizing psychology as one of the major disciplines as a lot organizations require behavior specialists to better understand employee needs insofar that modern business strategies are being formulated keeping in view human behavior both at the employee as well as end user level.
- d. To create a major appeal to students who do not see themselves as traditional psychologists, but rather are interested in the values and application of psychology as they can be translated into improved life conditions and psychological well-being. Thus stem the draining out of talent.

e. To strengthen and expand the growth of Professional Psychology as a profession in Pakistan and to impart specialized training in the field of Psychology.

### **BS PSYCHOLOGY SELECTED AS OF MOST APPROPRIATE LEVEL OF PROGRAM FOR LAUNCHING**

6. With above perspective in view and subject to availability of funds and space (for class rooms, labs and faculty), it is suggested to start BS level Psychology program to begin with. And later on postgraduate programs may be offered.

7. In order to assess the ground realities a survey to gauge the prospects of launching BS Psychology program was conducted. In this regard Professional Psychology experts and subject specialists from following Universities (in Lahore) were also consulted to obtain their point of view:

a. Dr Rukhsana Kausar, Professor/Director, Institute of Applied Psychology and Center for Clinical Psychology, University of the Punjab, Lahore.

b. Dr Nashi Khan Professor, Center for Clinical Psychology, University of the Punjab, Lahore. Former President PACP. Present Vice Present PACP.

c. Dr Shazia Hassan , HoD Department of Humanities, Central Punjab University, Lahore.

8. All of the above mentioned contemporary experts in the field agreed upon the fact, that despite of very thick and competitive market in Punjab there is a need and scope for launching BS Psychology Program in Lahore. Dr Nashi Khan was of the view that later on Bahria University may also work on launching Forensic Psychology program and be the pioneer in the field as none of the universities in Pakistan are offering this specialty and there is upcoming demand and scope of the specialty in the field.

9. Based on input of the professionals in Lahore pros and cons for launching BS Psychology program are summarized in the following table:

S.No	Program	Pros	Cons
01	BS Psychology	<p>1. It would involve least resources for at least two semesters.</p> <p>2. It is considered to be the most economically viable program from Faculty and Material requirement (labs etc.) perspective.</p>	<p>1. Will require at least four years in showing the efficacy of the program.</p> <p>2. Will involve more funds and space after two semesters including class rooms, labs, faculty etc.</p> <p>3. Will not enable BU to develop linkage with industry quickly.</p> <p>4. Will have element of competition since Punjab University, GC college, Kennard college, Bacon House, COMSAT, Central Punjab University and several others are offering the program. And there is possibility that it might not attract many students initially.</p>

			5. In case the program does not prove a success due to less number of students, may have a negative impact.
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10. On the basis of the analysis stipulated in the table above, it emerges that due to competitive market with very established Universities in Lahore it is considered professionally prudent to launch program when Lahore campus is prepared to cater space requirements essential to offer quality education and other facilities to the potential candidates. Taking due cognizance of competition it is important that program is marked well before its launch. It is assessed that BS Psychology is the most professionally and economically viable program for launching in the first place and later on other program(s) may be considered for launching.

### **BS PSYCHOLOGY (ROAD MAP)**

It is a 04 years 08 Semesters program.

<b>Semester</b>	<b>Name of subject</b>	<b>Credits</b>
1 <sup>st</sup> Semester	English I	3
	Pakistan Studies	2
	Fundamentals of Biology	3
	Introduction to Computer Science	3
	Introduction to Psychology	3
		<b>14</b>
2 <sup>nd</sup> Semester	English II	3
	Introduction to Microeconomics	3
	Mathematics	3
	Social Psychology	3
	History and Schools of Psychology	3
	Islamic Studies/ Ethics	2
		<b>17</b>
3 <sup>rd</sup> Semester	Oral Communication	3
	Introduction to Macroeconomics	3
	Principle of Marketing	3
	Theories of Personality I	3
	Counseling	3
	Experimental Psychology I	3
		<b>18</b>
4 <sup>th</sup> Semester	Creative Writing	3
	Management	3
	Theories of Personality II	3
	Psychology of Lifespan	3
	Experimental Psychology II	3
	Psychological Practicum	2
		<b>17</b>
5 <sup>th</sup> Semester	Statistics	3
	University Requirement	3

	Mental Health & Psychopathology I	3
	Cognitive Psychology	3
	Positive Psychology	3
	Psychological Testing I	3
		<b>18</b>
6 <sup>th</sup> Semester	University Requirement	3
	Statistical Tools for Social Sciences	3
	Mental Health & Psychopathology II	3
	Neurological Basis of Behavior	3
	Clinical Psychology	2
	Psychological Testing II	3
		<b>17</b>
7 <sup>th</sup> Semester	University Requirement	3
	Internship	2
	Research Methodology I	3
	Elective: Choose one	
	Teaching & Learning	3
	Consumer Behavior	
	Psychology of Cross Cultural Differences	
	Clinical Pharmacology	
	Educational Psychology	2
	Elective: Choose one	
	Counseling for HIV/ AIDs and STIs	3
	Child Psychology	
	Psychology of Motivation	
		<b>16</b>
8 <sup>th</sup> Semester	Research Methodology II	3
	Elective: Choose one	
	Community Psychology	3
	Psychology of Special Children	
	Environmental Psychology	
	Human Resource Management	
	Elective: Choose one	
	Psychology of Leadership	3
	Group Dynamic	
	Applied Behavioral Analysis	
	Organizational Psychology	2
	Research Project	4
		<b>15</b>

<b>University Requirements</b>	57 Cr. Hrs
<b>Psychology Courses</b>	75 Cr. Hrs
<b>Total</b>	132 Cr. Hrs

**Eligibility Criteria:**

Intermediate / A-level / Equivalent with minimum 50% marks (excluding NCC). Passing of entry test is mandatory.

**COURSE DESCRIPTION****BS Psychology (Course Description)****FIRST YEAR****BS First Semester:****ENGLISH I:**

This course introduces students to the fundamentals of English language. Grammatical structures, language mechanics, critical reading and comprehension, will constitute the core components of this course. It involves interactive learning methods, where students will be encouraged to think, speak and express themselves in English.

**PAKISTAN STUDIES**

The Course includes ideology of Pakistan in the historical perspective; two nation theory and Pakistan movement; creation of Pakistan and the role of Quaid-e-Azam Muhammad Ali Jinnah; Initial difficulties after the creation of Pakistan, Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan, study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

**FUNDAMENTALS OF BIOLOGY**

Students are introduced to the definition and concept of life. Theory of evolution. Chemical basis of life; Structure and the basis of function, Chemical diversity. Classification of organisms, Order of classification, Types of kingdom, Description of Phyla, Photosynthesis, Transpiration, Parts of a plant and internal structures of root, leaf and stem. Introduction to cell: Classification and its structure. Cell Division. Contribution of scientists, Description of human body organs and internal body functions, Growth of organisms and Development stages. Introduction to Genetics.

**INTRODUCTION TO COMPUTER SCIENCES**

This course focuses on history of computer development; Application of computers; classification and types of computer; Basic block diagram of a computer; Hardware (input, output, memory, CPU) and software (system software and application software); social impact of computer age; Computer in education and scientific research; Introduction and history of Internet; Internet service providers and connections; the world wide web.

**INTRODUCTION TO PSYCHOLOGY**

The objective of the course is to give students experience in thinking psychologically about individual and social behaviors. The historical and theoretical foundations of Professional Psychology are also explored. Students will learn about a broad range of psychological concepts through different perspectives. This course addresses History of Modern psychology, Muslim contribution to psychology, nature, scope and branches of psychology, sensation, perception, attention, memory, theories of intelligence, motivation, emotion, learning and problem solving.

**BS Second Semester:****ENGLISH II**

This course introduces students to the fundamentals of English language. Grammatical structures, language mechanics, critical reading and comprehension, will constitute the core components of this course. It involves interactive learning methods, where students will be encouraged to think, speak and express themselves in English.

### **INTRODUCTION TO MICROECONOMICS**

The study of demand and supply, consumer behavior, firm behavior, analysis of cost, market structure, general equilibrium, economic role of government, theory of production.

### **MATHEMATICS**

Linear Function; Quadratic equations and their solutions; Metrics and determinants; partial functions; binomial expansion; mathematical induction; logarithmic function; sequence and series; basics of vector analysis; trigonometric ratios and trigonometric identities; analytical geometry and classifications of conics, limits and rate of change of functions; introduction to differential and integral techniques, make the content of this course.

### **SOCIAL PSYCHOLOGY**

The course is designed to serve as an introduction to the scientific study of groups. The students will learn about the researches related to group development and dynamics (e.g. interaction, size, factors affecting interpersonal attractions etc). The topics covered are, introduction to group dynamics, nature of groups, theories of group formation and development, functions of group(s), nature and formation of attitudes, theories of attitude change, prejudice and theories of leadership.

### **HISTORY AND SCHOOL OF PSYCHOLOGY**

The course includes the chronological study of the history of ideas which contribute to the field of psychology. Early Greek philosophy including Empedocles, the Classical philosophers socrates, plato and aristotle along with epicureanism, stoicism and scholasticism remain the main focus of this course. Contributions of muslim philosophers are also highlighted. The beginning of modern science and philosophy is highlighted by topics such as the renaissance humanism, descartes, empiricism, sensationalism, positivism and rationalism early scientific beginnings of psychology are mentioned using structuralism and the psychobiological approaches. All these are linked to the placement of current psychological thought within the context of historical development.

### **ISLAMIC STUDIES/ ETHICS**

This course aims to provide basic information about Islamic studies, to enhance understanding of the students regarding Islamic Civilization, to improve student's skill to perform prayers and other worships and to enhance the skill of the students for understanding of issues related to faith and religious life.

## **SECOND YEAR**

### **BS Third Semester:**

#### **ORAL COMMUNICATION**

This course covers listening and speaking skills especially formal and informal group / individual presentations face to face communication meetings, group discussion. Develop understanding of the process of communication to use proper syntax and verbal structure of English language. Special emphasis on phonetics to correct pronunciation of English language.

#### **INTRODUCTION TO MACROECONOMICS**

The course includes introduction to major macroeconomics concepts, saving and investments, aggregate demand, national income, unemployment, banking system, inflation, trade balance, business cycles, economic policies.

### **PRINCIPLE OF MARKETING**

The course is designed to enable students to be familiar with the basic theories, concepts, methods, variables, problems, practices, processes, and terminology of contemporary marketing. It is expected that the students will utilize analytical, decision-making, and problem-solving skills that approximate the “real world” marketing. Simultaneously, they would develop an awareness of the breadth of possible applications of marketing and a consciousness about the importance of ethics in the discipline of marketing.

### **THEORIES OF PERSONALITY I**

The course focuses on understanding personality growth and development through different perspectives and theories based on psychodynamic, humanistic and behavioral viewpoints. Students will learn about strengths and weaknesses of various personality theories. This course is designed to teach nature, determinants & definition of Personality including psychoanalytic, social learning, behavioral, humanistic and trait theories of personality.

### **COUNSELING**

The basic theories, principles, and techniques of counseling are explored in this course. The content includes definition and nature of counseling, core conditions in counseling, structure of counseling center, different theories of counseling, basic counseling skills and techniques.

### **EXPERIMENTAL PSYCHOLOGY I**

The focus of the course is to introduce students about theoretical and historical foundations of psychology. It will help the students to understand the empirical and scientific basis of psychology. The topics include definition and scope of experimental psychology, historical roots of experimental psychology, and important proponents of the field and their contributions, researches and lab experiments related to cognition, memory, sensations, perception, judgment and learning.

### **BS Fourth Semester:**

### **CREATIVE WRITING**

Students will be introduced to different forms and practices of creative writing; the focus will be on the development of skill in writing poetry, fiction, short stories, drama, and critique of others' works.

### **MANAGEMENT**

The course is aimed towards the teaching of management, its basic concepts, principles and methodologies; it would demonstrate their application to various business sectors. The specific course objective will be planning, organizing, leading, controlling, and understanding the principle of management, and management in the global context. Students will understand most contemporary issues in management, the basic elements of planning and decisionmaking, the organizational process, motivation of employees, leadership team management of teams and groups, managing quality and the management of information systems.

### **THEORIES OF PERSONALITY II**

The course focuses on understanding personality growth and development through different perspectives and theories based on Psychodynamic, Humanistic and Behavioral view points. Students will learn about strengths and weaknesses of various personality theories. This course

is designed to teach nature, determinants & definition of Personality including Psychoanalytic, Social Learning, Behavioral, Humanistic and Trait theories of Personality.

### **PSYCHOLOGY OF LIFESPAN**

The main objective of this course is to help the students understand and examine normal development from infancy to old age. The topics included are introduction and historical view of lifespan psychology, theories of development, stages of development (e.g. prenatal, infancy, childhood, adolescence, adulthood, old age), facts and theories related to different areas of growth (e.g. physical, social and psychological), cultural and individual differences are also a focus of the course.

### **EXPERIMENTAL PSYCHOLOGY II**

The focus of the course is to introduce students about theoretical and historical foundations of psychology. It will help the students to understand the empirical and scientific basis of psychology. The topics include definition and scope of experimental psychology, historical roots of experimental psychology, and important proponents of the field and their contributions, researches and lab experiments related to cognition, memory, sensations, perception, judgment and learning.

### **PSYCHOLOGICAL PRACTICUM**

Experiments (Any eight of the following experiments): Muller-Lyer Illusion; Maze Learning; Transfer of Training; Whole Vs Part Learning; Meaningful Vs Nonsense Learning; Memory: Function of Recitation; Memory: Method of Serial Reproduction; Memory Function of Time (Saving Method); Color Zones of Retina; Span of Attention; Fluctuation in Attention; Problem Solving; Concept Formation; Size Constancy; TAT 3 cards; Mapping Cutaneous Sense Spot; Trial Position Effect under Massed and Distributed Practice; Retroactive Inhibition; Simple Reaction Time; Perceptual Grouping; Retention for Complete and Interrupted Task; Mental Fatigue; Negative After-Image; Judgment Time; Thermal Adaptation; Personality Tests; Gordon Personal Profile; Human Figure Drawing.

## **THIRD YEAR**

### **BS Fifth Semester:**

#### **STATISTICS**

Collection and interpretation of data; data array and frequency distribution; measure of central tendency: mean (all types), median, mode; measure of dispersion: mean deviation, standard deviation, variance and skewness; introduction to probability; probability distribution; curve fitting and regression analysis; sampling and sampling distribution and interval estimates in samples; statistical inference; testing of hypothesis using z, t and f tests.

#### **MENTAL HEALTH & PSYCHOPATHOLOGY I**

The focus of this course is to familiarize students with major theories, etiology of mental disorders and DSM approach to diagnosis and classification. The course content includes definition of abnormal psychology, historical and theoretical perspective of abnormal psychology, criteria of normal and abnormal behavior, psychopathology (neurosis, psychosis, mood disorders, personality disorders, anxiety disorders and schizophrenia). eating disorders, mood disorder, adjustment disorder, somatoform disorders, sexual & gender identity disorders, delirium, dementia, amnesic and other cognitive disorders, anxiety disorders, factitious disorders, dissociative disorders and impulse control disorders.

#### **COGNITIVE PSYCHOLOGY**

This course is designed to develop empirical basis of ontogenetic model and functioning of psychological structures responsible for adaptation. The course content includes meaning and



definition of cognition and cognitive processes, evolution of cognitive structures, emotions and role of cognitive processes in human creation of meaning and perception, experiments conducted by psychologists in the past regarding cognitive development and understanding cognitive processes (e.g. memory, learning, judgment, sensation and perception). The role of cognitive functioning in clinical context will also be explored.

### **POSITIVE PSYCHOLOGY**

The course provides fundamental knowledge about the field of positive psychology helping students to enhance positivity in their lives and apply their knowledge to the community. It includes the nature and scope of positive psychology, evolutionary perspectives, positive personal traits, subjective wellbeing, hope, optimism, creativeness, giftedness and industry, judgment, wisdom and fairness, along with several other factors responsible for the creation of intrinsic motivation. Social development is explored generally in life and at work in the context of leadership potential. Spirituality is also explored in the framework of a multicultural society with love, kindness, hope, respect, modesty and forgiveness.

### **PSYCHOLOGICAL TESTING I**

Students will achieve an understanding of the measurements and evaluation relevant to the broad field of clinical, educational and organizational psychology. Students will achieve an understanding of the development, validation, and application of assessment instruments, observational method and interviews. The topics covered include nature and uses of psychological tests, historical antecedents of modern testing, reliability, validity, ethical and social considerations in testing, test construction and general steps in test construction it includes history taking (interviewing) and the administration, scoring, interpretation and report writing of SPM, CRI, IPAT Scales LISRES and WRAT-4

### **BS Sixth Semester:**

### **STATISTICAL TOOLS FOR SOCIAL SCIENCES**

This course is designed to provide students with an understanding of quantitative methods employed extensively in the social sciences. The students will learn how to use statistical tools in the social sciences.

### **MENTAL HEALTH & PSYCHOPATHOLOGY II**

The focus of this course is to familiarize students with major theories, etiology of mental disorders and DSM approach to diagnosis and classification. The course content includes definition of abnormal psychology, historical and theoretical perspective of abnormal psychology, criteria of normal and abnormal behavior, psychopathology (neurosis, psychosis, mood disorders, personality disorders, anxiety disorders and schizophrenia). eating disorders, mood disorder, adjustment disorder, somatoform disorders, sexual & gender identity disorders, delirium, dementia, amnesic and other cognitive disorders, anxiety disorders, factitious disorders, dissociative disorders and impulse control disorders.

### **NEUROLOGICAL BASIS OF BEHAVIOR**

The course introduces students to the structure and functions of the central nervous system, the autonomic nervous system, and the endocrine system. Areas covered include, Introduction to structure of cell, action potential, structure and function of Brain & spinal cord, introduction to autonomic and endocrine system, familiarization with sensory and perceptual processes, physiological regulation of motivation, sleep and waking cycle and affect. The etiology and major focus of psychopathology will be considered from a biological perspective.

### **CLINICAL PSYCHOLOGY**

The course is designed to provide the fundamental information and theoretical frame work about the basic concepts related to the field of clinical Psychology. It also through light on the

professional ethics related to the field regarding research and professional practice. The topics include definition and scope of clinical psychology, historical background and training in clinical psychology, theoretical models, Clinical assessment, ethical principles and code of conduct in clinical psychology, basic therapeutic techniques, brief introduction to humanistic, cognitive behavioral and psychoanalytical interventions.

## **PSYCHOLOGICAL TESTING II**

Students will achieve an understanding of the measurements and evaluation relevant to the broad field of clinical, educational and organizational psychology. Students will achieve an understanding of the development, validation, and application of assessment instruments, observational method and interviews. the topics covered include nature and uses of psychological tests, historical antecedents of modern testing, reliability, validity, ethical and social considerations in testing, test construction and general steps in test construction it includes history taking (interviewing) and the administration, scoring, interpretation and report writing of SPM, CRI, IPAT Scales LISRES and WRAT-4

## **FOURTH YEAR**

### **BS Seventh Semester:**

#### **INTERNSHIP**

Candidate will have to register for internship and will be given the opportunity to observe diagnostic interview sessions. Candidates will learn several techniques for interviewing, including listening skills, aids of giving and receiving feedback, and establishing requirement.

#### **RESEARCH METHODOLOGY I**

The main objective of this course is to introduce students with different research designs and methodology. This course is designed to help them clarify their concepts regarding variables and conditions in research. Contents of the course include Definition and types of research, experimental control, validity, reliability, sampling, qualitative & quantitative research, experimental designs (e.g. single subject and independent group design, design confounds and critical evaluation of published psychological researches).

### **ELECTIVE: CHOOSE ONE**

#### **TEACHING & LEARNING**

Introduction to teaching and learning, classroom management, individual differences in class, teacher student relationship, adult learning models, learning assessment, facilitation of discussion and class activities; issues of classroom instructions.

#### **CONSUMER BEHAVIOR**

Students will be introduced to the major theories underlying consumer behavior. Topics include marketing, advertising and propaganda, factors effecting consumer behavior, cultural, social, psychological and personal factors, business market and business buyer behavior.

#### **PSYCHOLOGY OF CROSS CULTURAL DIFFERENCES**

Introduction and history of cross cultural psychology; methodological issues of cross cultural psychology; culture and basic psychological processes; new trends in cross cultural research; individualism & Collectivism; Indigenous Psychology.

#### **CLINICAL PHARMACOLOGY**

Various classes of psychopharmacological agents are systematically considered. Methods and interventions in psychobiological conditions are reviewed with the emphasis on the use of psychotropic medications to manage and treat psychological disorders.

## **EDUCATIONAL PSYCHOLOGY**

Introduction to Educational Psychology, historical background, fields and scope of educational psychology, Cognitive and Linguistic development, Motivation & Students Achievement, theories of Learning, research in Educational Psychology and major research methods.

### **ELECTIVE: CHOOSE ONE**

#### **COUNSELING FOR HIV / AIDS AND STIS**

Counsel the clients for HIV / AIDS with Confidentiality issues and taking care of Health and safety issues

#### **CHILD PSYCHOLOGY**

This course includes History and scope of child psychology, Child development, physical and psychological; Psychopathology in Children and Adolescents; Prevention of mental disorders; importance of child rearing patterns; Parenting: Effect of Separation/divorce on children/adolescents; Development of problems of puberty and sex roles in adolescence; Effect of maternal employment upon children/adolescences; Family structure; Sex education; Child abuse; Parental substance abuse.

#### **PSYCHOLOGY OF MOTIVATION**

The course contents includes definition, nature and scope, historical background, motivated behavior: characteristics and dominants, biogenic and sociogenic motives, motivation and its role in attitude change - national development - in organization, methods used to assess human motivation: projective techniques and techniques, methodological problems, motivation, power and politics, fostering achievement motivation and childrearing practices, variables which influence the achievement process, treatment approaches to underachievement.

### **BS Eighth Semester:**

#### **RESEARCH METHODOLOGY II**

The main objective of this course is to introduce students with different research designs and methodology. This course is designed to help them clarify their concepts regarding variables and conditions in research. Contents of the course include Definition and types of research, experimental control, validity, reliability, sampling, qualitative & quantitative research, experimental designs (e.g. single subject and independent group design, design confounds and critical evaluation of published psychological researches).

### **ELECTIVE: CHOOSE ONE**

#### **COMMUNITY PSYCHOLOGY**

The course comprises of introduction to community mental health; scientific research methods; social change in community; creating and sustaining social change; mental health problem in community; the seriously mentally disordered; coping with mental health problem; social, children and communities.

#### **PSYCHOLOGY OF SPECIAL CHILDREN**

The course includes treatment and Rehabilitation of special children, family counseling, different treatment approaches, strategies for Rehabilitation, working with special children and teacher-training programs.

#### **ENVIRONMENTAL PSYCHOLOGY**

The course provides students with an understanding of the scientific basis of environmental psychology and helps them in analysing the interaction between environment and human behaviour. The course includes the history of the development of Environmental Psychology

especially with reference to Pakistan. It includes the reviews of different aspects of environmental research and the links between noise, weather, climate and behaviour. How our behaviour affects the environment is studied in context of crowding and territoriality and motivating a city to build green. In the end it all comes full circle with the environment affecting the psyche and in turn being affected by it.

## **HUMAN RESOURCE MANAGEMENT**

The course focuses on how human resource adds value to the organization's business strategy. It addresses the human resource agendas. It reviews the changing nature of the HR, the HRM functions, employee relations, recruitment, selection, benefits and compensation; performance and reward, training and development, the legal context of employee relations, international business law, HRM techniques, organizational assessment and research methodology, working with organized labor and HRM in respect of cultural diversity with in Pakistan and the International HR challenges.

This course will enhance the students understanding of the strategic aspects of managing human resources in the public and private service environment which is constantly changing.

## **ELECTIVE: CHOOSE ONE**

### **PSL 451: PSYCHOLOGY OF LEADERSHIP**

This Course reviews the principal theories of leadership and how leadership is developed. It examines leadership in the context of managing continuous change, emphasizing the challenges of multinational corporations working across cultures. It supports self-assessment as students gain knowledge in the key theories and principles of the management/leadership continuum. Finally, it reviews practices that I/O psychologists are using to develop organizational leaders.

### **GROUP DYNAMICS**

The course is designed to serve as an introduction to scientific study of groups. The students will learn about the researches related to group development and dynamics (e.g. interaction, size, factors affecting interpersonal attractions etc). The topics covered are introduction to group dynamics, nature of groups, theories of group formation and development, functions of group, nature and formation of attitudes, theories of attitude change, prejudice and theories of leadership.

### **APPLIED BEHAVIORAL ANALYSIS**

This course will familiarize students with behavioral principles and their applications to diverse populations. The topics include ; Basic principles of learning, theory of classical and operant conditioning their Theoretical and research foundation, schedules of reinforcement, stimulus control, shaping, punishment and its effects; designing and assessing behavior intervention programs, application of basic principles of behavior to produce effective change. This course also includes lab work in which students will practice and learn behavior analysis through observation and measurement. The candidate will also learn behavioral principles and procedures to increase, reduce, or promote the generalization and maintenance of behavior.

### **ORGANIZATIONAL PSYCHOLOGY**

The course develops students conceptual foundation in organizational psychology by providing an in depth overview of all areas of organizational psychology. The content includes general introduction to organizational and applied psychology Personnel selection, job analysis, training, selection, criterion development, performance appraisal achievement, motivation and job satisfaction including research in organizational psychology, cultural, ethical and religious issues in organizational research.

## RESEARCH PROJECT

Students will get the opportunities to develop psychological research skills including use of appropriate research instruments and data analysis, scientific writing skills, capacity to critically evaluate research data.

## REQUIREMENTS

### Human Resource (HR) Requirements:

**Teaching Faculty Requirements.** The program may be started with following number of permanent faculty members:

S No	Name of Post	No	Qualification
1	A faculty member in leading role/HOD	01	Professor/Associate or Assistant Professor as per HEC criteria
2	Lecturer	02 ( one in first year and one in second year)	M.Sc/MA Psychology from HEC recognized University

In addition to this visiting faculty members will be required for teaching other subjects (or students may take from other departments offering the same courses) OR (it will also be useful to check if faculty from other departments could be shared if their course load is less than the requirement.

### Supporting Staff Required

S No	Name of Post	No	Grade
01	Student Advisor (SA)	01	As per BU policy
02	PA for HOD	01	As per BU policy

**Offices/Cubical Requirement.** Following is the detail of space requirement:

S No	Space Required for	Quantity
01	HOD office With space for PA & SA	01
02	Faculty cubicles	01 in the first and 01 in the second year

17. **Class Rooms Requirements.** Classes may be conducted in morning. The following space will be required for the class rooms for the first semester. This will increase by 01 class room in the next semester and so on: With two intakes per year i.e 25 to 35 students in Fall and spring semester respectively the department would require 6 to 8 classrooms to run the program effectively as the program comprises of 8 semesters.

S No	Space Required for	Quantity	
01	Class room	01	For 25 to 35 students

**Computer lab to be allocated as per requirement in the first semester for introduction to computer science course.**

DD Lahore Campus and the HODs of all departments of the Lahore campus after considering the space requirement are of the opinion that program may be launched after fall 2016 subject to addition of one floor to Lahore Campus building for the department. Considering the space constraint already faced by campus it is deemed appropriate to be mindful of the issues the department may come across after a year of launch program without addition of classrooms or one floor in the Campus. Therefore, the general consensus at BULC is that "BULC will be ready to launch the program any time from Fall-2016; subject to construction of an additional floor on top"

**Furniture Requirement.** Existing furniture may be utilized in case classes schedule is adjusted to meet the requirement of courses. 100 chairs. Office table and chair for HOD, faculty and staff.

**Lab Requirements:** May be worked out later as it will be required in forth semester.

**Library Requirements:** Existing library resources are expected to meet the needs with addition of 100 more books related to different subjects of psychology.

**Other Requirements:**

S No	Item	Quantity
01	Computers	01
02	Multimedia	01

**Revenue and Expenses:**

The table below will give an idea of possible expenses associated with program initially without addition of one floor in the building of the Lahore Campus.

ESTIMATED EXPENSES	ESTIMATED AMOUNT (Rs.)	REVENUE	ESTIMATED AMOUNT(Rs.)
Personnel cost	=2,223,000/-	Student fee in case of (two semesters )  • BS (20 Std)	= 4,618,000
Books, and others	=7,00,000/-		
<b>Total</b>	<b>=2,923,000/-</b>		

## **CONCLUSIONS**

Based on the deliberations in proceeding paragraphs, following is concluded:

- There are sound rationales for commencement of Professional Psychology Department at Lahore Campus.
- Based on the opinion of Practicing Clinical Psychologist and subject experts and also taking into consideration the target market; it is considered prudent to launch BS Psychology Program in the first place. Subsequently Post graduate Psychology level Program(s) can be considered for launching.

- c. Considering the space constraint already faced by Lahore campus it is deemed appropriate to be mindful of the issues the department may come across after a year of launch program without addition of classrooms or one floor in the Campus. Therefore, the program may be launched with two rooms to start with however within a year time construction of an additional floor would be essential to meet the competition with other well established universities and attract students.

## **RECOMMENDATIONS**

Based on above following is recommended:

- The program may be launched at Lahore Campus.
- Approval for two intakes per year i.e. 20 students in fall and spring semesters respectively may be accorded.
- Subject to the approval of the proposed, financial approval to meet the HR, material and Space requirement may be accorded.

Amount mentioned in Working Paper				6631700						
1st (Fall Intake)						2nd (Spring)				
Naval	50600		0			32450		0		
Civil	83500	20	1670000			63900	20	1278000		
				1670000						1278000
No of Students						Total Income				4618000
1st (Spring Intake)						2923000	Total Expenditure			
Naval	50600		0							
Civil	83500	20	1670000							
				1670000						
						Total Saving After Expenditure				1695000

## Proposal for the Launch of MS Supply Chain Management at BULC

### Background to the Case

1. Due to Globalization and shifting of international businesses to our door steps, the importance of Supply Chain management has increased manifold. The international trade has grown exponentially and new supply chain terminologies have evolved with the development of technology the world over. To compete with the domestic and international demand, a successful supply chain can produce that competitive edge which is missing in our business industry, today. The pursuance of this degree program will enable the students to deal more professionally in supply chain management and thus improve and promote the production and transportation of our goods nationally and international.
2. Supply Chain Management has been acknowledged as a major area in business these days. This is obvious from the fact that leading universities of the US, UK and Australia, among other countries, are conducting PhD in supply chain management.
3. International Certifications in Supply Chain Management has also been introduced by the most leading trade organization, called, International Trade Center. Their educational Head Office is in Switzerland. This is the organization that works in collaboration with World Bank and the United Nations in controlling the world trade.
4. BULC finds the Lahore market lucrative for SCM candidates. Our analysis of nearby competitors also shows good market prospects for MS(SCM) at BULC. The case is tabled for approval as a weekend programme. Case Feasibility Study is attached as **Annexure-(A)**.

### *A Comparison with the Competitors*

5. The following universities are also offering similar programs and here are some statistics of these universities to assess the local market dynamics:

<b>Institution</b>	<b>Degree Offered</b>	<b>Fees of Complete Degree (approximately)</b>
Lahore Leads University	Masters in SCM 2 years	Rs. 287,000
University of Management & Technology	MS –SCM 1.5-2.5 Years	Rs. 450,000
Superior University Lahore	MS(SCM) 2 Years	Rs. 300,000
University Of Central Punjab	MBA (Operations & SCM) 2 Years	Rs. 270,000

**Source:** University's websites and telephonic inquiries

6. It may be noted that our program fee (**Rs. 199,560/-**) is lesser than that of the competitors in Lahore

### HR Implications:

7. The following are the HR Implications for the launch of MS Supply Chain Management at BULC:
  - One Permanent PhD faculty will be required as a Cluster Head for Weekend Programmes (not budgeted in this programme as this will be required for all weekend/ evening



programmes)

- One Department Supervisor for Weekend/ Evening Programs (budgeted in this program but definitely will work for entire weekend/ evening programs)
- At least five (5) visiting faculty members will be required. 2 Courses will be given existing permanent faculty.

### **Financial Implications:**

8. Department supervisor for weekends/ evening @Rs. 20,000/m: Rs. 240,000 /annum

1<sup>st</sup> intake: 2 Visiting Faculty @ 2,000 /hour Rs: 2 \* 48 \* 2,000 = (192,000)

Total 1<sup>st</sup> intake: (432,000)

2<sup>nd</sup> intake: 5 Visiting Faculty @ 2200 / hour Rs: 5 \* 48 \* 2,200 = (528,000)

Total 2<sup>nd</sup> intake (528,000)

Marketing and Advertisement cost: (Rs. 500,000)

***Total expense for 1 year: Rs: 432,000+ 528,000 = Rs: (1,460,000)***

### **Conclusion**

10. The programme is in line with current BU Policy and financially viable within one year, if 20 students are enrolled in 1 year (2 intakes of 10 each) and net saving will be of Rs. 778,000/. The details are shown in **Annexure-(A)**.

11. At present, three semesters of MSPM and 3 semesters of MBA (Weekends) are being run on weekends at BULC. The launch of MS Supply Chain Management and PhD (which already approved by the ACM) will further increase the workload and student strength on weekends. Therefore, in addition to budgeted HR requirements, there would be a need of Cluster Head for Weekend/ Evening Programmes at BULC.

### **Recommendation(s) to the Academic Council:**

12. Following are the recommendations to the Academic Council:
- a) The launch of MS Supply Chain Management at BULC (with two intakes per year, 10 students per each intake) from the Fall 2016 may please approved.
  - b) The provision of Cluster Head for Weekend/ Evening Programmes at BULC may please be approved.

### ***Form for Beginning a New Academic Programme***

#### **MS in Supply Chain Management**

<b>A. Academic details:</b>
<b>1. Faculty/ Institute/Department:</b> Management Sciences, BULC
<b>2. Name of Program:</b> MS in Supply Chain Management
<b>3. Duration:</b> 18 Month (Trimester) 33 Cr. Hrs.
<b>4. Venue(s):</b> BULC w.e.f. Fall-2016
<b>5. Whether the proposed program will be offered in (morning/evening/weekend):</b> Evening/

<b>6. Number of <u>Extra</u> Faculty Member(s) or Skilled-worker(s) Required?</b> <i>It would require a cluster head (Supply Chain), One faculty from the permanent faculty at BULC and at least 5 visiting faculty members and department supervisor for evening/ weekend programs. Eventually BU faculty will be certified by ITC and more BU regular faculty will</i>
<b>7. Any extra class room(s) required? If yes, how may? And what will be their capacities required? (Provide details):</b> <i>Not Required</i>
<b>8. Any extra laboratories required? If yes, how many? And what additional equipment will be required? (provide details of equipment, use extra sheet if necessary):</b> <i>Not</i>
<b>9. Minimum Entry Level:</b> <i>16 years of Education from HEC recognized institutes.</i>
<b>10. Admission Criteria:</b> (a) BU Entry Test or Valid NTS GAT passed in less than last two years (b) CGPA 2.5 from the last degree or 50 % marks from non-CGPA / Annual system.
<b>11. Proposed Date of Commencement:</b> <i>After Approval by Fall - 2016</i>
<b>12. Mode of Study / Examination:</b> <i>Semester System and MS Examination policy of BU</i>
<b>13. Brief Description &amp; Rationale of the Program:</b> <i>Attached</i>
<b>14. Complete Plan of Studies</b>  <b><u>Background to the Case:</u></b> <ul style="list-style-type: none"> <li>Due to Globalization and shifting of international businesses to our door steps, the importance of Supply Chain management has increase manifold. The international trade has grown exponentially and new supply chain terminologies have evolved with the development of technology the world over. To compete with the domestic and international demand, a successful supply chain can produce that competitive edge which is missing in our business industry, today. The pursuance of this degree program will enable the students to deal more professionally in supply chain management and thus improve and promote the production and transportation of our goods nationally and international.</li> <li>Supply Chain Management has been acknowledged as a major area in business these days. This is obvious from the fact that PhD in supply chain management can be obtained from the leading universities of the US, UK and Australia among other countries.</li> <li>International Certifications in Supply Chain Management has also been introduced by the most leading trade organization, called, International Trade Center. Their educational Head Office is in Switzerland. This is the organization that works in collaboration with World Bank and the United Nations in controlling the world trade.</li> <li><b><u>Proposed Roadmap:</u></b> The Roadmap for MS in Supply Chain Management already approved and in practice at other campuses of BU is given in <b>Annex-I</b></li> </ul>
<b>15. Course Outlines:</b> <i>Course Description and topics to be covered already approved and in practice at other campuses of BU are attached in <b>Annex-II</b></i>
<b>16. Examination Policy:</b> <i>As per BU Policy for MS management sciences programs</i> <b>Grading Policy:</b> <i>As per existing examination criteria and BU policy)</i>
<b>17. Number of Admissions Expected for First Intake:</b> <i>Expected admission: 15 students</i>
<b>18. Number of Admissions Planned/Expected for Subsequent Intakes:</b> <i>Admission twice in a year, at least 15 in each intake.</i>
<b>19. Date of Approval by the Board of Study? (Write the date. If approval is conditional, write</b>

## **B. Financial Analysis:**

**1. Any Agency (Public/Private) Funding this Program (Fully/Partially?)** (Provide complete detail including extent of funding and mode of disbursement): *NIL*

<b>2. Expected Earning from First Intake:</b> Per Student Fee: Approx. Rs. 199,560 three semester( 82,680 + 58,440 + 58,440) Expected Intake: 10 (Students) Expected Revenue: Rs. 10 * 82,680 = <b>Total Rs:</b>
<b>3. Projected Earnings for the Next intake:</b> (10 * 82,680) = <b>Rs: 826,800</b> 2 <sup>nd</sup> semester fee (10 * 58,440) = <b>Rs: 584,400</b> <b>Total: Rs: 1,411,200</b>
<b>4. Total Estimated Salaries of Extra Human Resources per Annum:</b> Department supervisor for weekends/ evening @Rs. 20,000/m: Rs. 240,000 /annum 1st intake: 2 Visiting Faculty @ 2,000 /hour Rs: 2 * 48 * 2,000 = (192,000) <b>Total 1st intake: (432,000)</b> 2nd intake: 5 Visiting Faculty @ 2200 / hour Rs: 5 * 48 * 2,200 = (528,000) <b>Total 2nd intake (528,000)</b>  <b>Total expense for 1 year: Rs: 432,000+ 528,000 = Rs: (960,000)</b>
<b>5. Cost of Extra Laboratory Equipment/Tools (if required):</b> NIL
<b>6. Cost of Extra Books for the Library: (If required):</b> SCM already available with
<b>7. If the Venue is Hired, provide Annual Rental Expenses and Cost of other Fixtures:</b>
<b>8. Miscellaneous Expenses Required for Starting the Program ((write all expenses required for Furniture, marketing, Advertisements, Prospectus-Printing etc.):</b> Marketing and
<b>9. Total Annual Recurring Expenditures Required in Subsequent Years: (like Salaries, Advertisements, and Stationeries etc.):</b> Not calculated but would depend upon the intake of students.

<b>C. Program Viability</b>
<b>1. Total Expenditures Required: Add B.4 to B.8: Rs 1,460,000</b>
<b>2. Net Expenditures Required: Subtract B.1 from C.1: Rs 1,460,000</b>
<b>3. Net Earnings in First Year: Subtract C.4 from B.2 + B.3: Rs: 2,238,000 – Rs 1,460,000= Rs:</b>
<b>4. Projected Annual Gross Earning in Subsequent Years:</b> No working
<b>5. Projected Annual Net Earning in Subsequent Years (Subtract B.9 from C.4):</b> No

### **Road Map for MS in Supply Chain Management**

#### **Semester-1**

Srl. #	Course Code	Course Title	Level	Cr. Hrs.
1	SCM-701	Fundamentals of Supply Chain Management	Core	3
2	SCM-702	Short Listing Suppliers and Selecting Offers	Core	3
3	SCM-703	Contracting and Negotiation	Core	3

#### **Semester-2**

Srl. #	Course Code	Course Title	Level	Cr. Hrs.
1	SCM-704	Business Research Methods (Focus SCM)	Core	3
2	SCM-705	Managing Logistics and Inventory in Supply Chain	Core	3
3	SCM-706	Measuring Performance (Monitoring & Evaluation)	Core	3
4	SCM-707	Procurement: Environmental, Group and Electrical	Core	3

**Semester-3 (Non Research)**

Srl. #	Course Code	Course Title	Level	Cr. Hrs.
1	SCM-708	CRM and Operations Management	Core	3
2	SCM-709	Managing Finance along the Supply Chain	Core	3
3	SCM-7nn	Elective-1	Spec.	3
4	SCM-7nn	Elective-2	Spec.	3

**Semester-3 (Research Thesis)**

Srl. #	Course Code	Course Title	Level	Cr. Hrs.
1	SCM-708	CRM and Operations Management	Core	3
2	SCM-709	Managing Finance along the Supply Chain	Core	3
3	SCM-711	Research Thesis	Research	6

**Electives**

Srl. #	Course Code	Course Title	Concentration
1	SCM-721	Packaging in Supply Chain	Supply Chain
2	SCM-722	Supply Chain Management for SME's	Supply Chain
3	SCM-723	Supply Chain Risk Management	Risk Management
4	SCM-724	Planning, Scheduling and Time Management	Project Management
5	SCM-725	Regulatory Framework for Trade Harmonization in	Supply Chain
6	SCM-726	Mathematical Modeling & Optimization Techniques	Supply Chain (CBT)*
7	SCM-727	Software & Simulations (LOGWARE, TORA,	Supply Chain (CBT)*

(CBT)\* = Computer Based Training

**COURSE OUTLINE FOR MS (SUPPLY CHAIN MANAGEMENT)****CORE COURSES****SCM-701: Fundamentals of Supply Chain Management****Course Description:**

This course will revolve around four concepts:

- ☐ Understanding the corporate environment
  - o The corporate environment, including ownership and size, corporate culture, mission, goals, policies and strategy directly influence the way in which the purchasing & supply chain management function is organized and operates. The objectives, policies and strategies of the purchasing & supply chain management function must be aligned with those of the rest of the enterprise.
- ☐ specifying requirements and planning supply
  - o Specifying what an enterprise needs to purchase along with how much it needs and when and where it is required is the first, critical step in the purchasing & supply process. It must be done correctly if the rest of the process is to be successful.
- ☐ Analyzing supply markets
  - o Knowing supply markets is the basis for understanding supply risks, opportunities and costs, and for making correct supply decisions. Monitoring and analysing supply markets helps the buyer to recognise how supply markets function and to compare and assess supply market options.

- Developing supply strategies
  - Supply strategy should be based on assessed requirements and supply market conditions. It will depend on the buyer's levels of expenditure and of the supply risks involved. Supply strategy involves considering issues such as: the number and types of suppliers to use, the type of supplier relationships to develop and of contracts to use, and which types of purchase operations (such as e-purchasing) to apply.

### **Course Contents**

- Corporate culture, mission, goal and policies
- Sector ownership and size
- Corporate strategy
- Corporate functions, processes and structure
- Objectives, policies, processes, culture and structure
- How to determine and specify all the different dimensions of what the enterprise needs to purchase
- Methodology and various practical tools to analyze supply markets in cost effective manners
- Assess risks and opportunities to select best supply markets
- Use information support for market analysis
- How to develop strategic partnership with suppliers and when it is better to spot buy.

## **SCM-702: Short Listing Suppliers and Selecting Offers**

### **Course Description:**

Selecting the right supplier is the fundamental basis for effective purchasing & supply. Alternative suppliers must be located, screened, further researched and assessed using appropriate criteria that relate to the type of purchase that is being carried out. This will involve reviewing suppliers' motivation and capabilities, including their financial situation. Purchasing & supply practice means knowing how to best obtain and select offers from suppliers. Depending on the type of purchase being made, different purchasing approaches and processes will be used (ranging from simple informal contacts to formal tendering). The method of evaluating offers will also vary depending on what is being bought.

### **Course Contents**

- How to locate, screen and further research suppliers
- Methodology for measuring and rating potential suppliers
- What are the important facts in short listing suppliers
- What procurement methods to use and when
- How to evaluate offers
- Decide how many suppliers to invite
- Formal tendering processes

### **Course Description:**

## **SCM-703: Contracting and Negotiating**

The contract specifies the buyer's and seller's main obligations, and determines the overall context under which the business relationship will be developed. It is important to understand which terms and conditions relate to the desired type of contractual relationship, and how to deal with issues such as applicable law, contractual default and the settlement of disputes. Once a contract is signed, it is important to ensure its effective implementation and to successfully manage the relationship with suppliers. The various issues involved in managing the contract must be understood, as well as the roles and responsibilities of each side's contract

management team.

Negotiation starts with effective preparation, including setting realistic and achievable negotiation objectives and determining the best possible strategy to be used. Conducting the negotiation itself involves applying the arts of active listening and of questioning, and using appropriate tactics and persuasion techniques.

### **Course Contents**

- ☐ How contract fits into the purchasing and supply process
- ☐ What are buyers and sellers main obligations
- ☐ What are the contracting terms and conditions
- ☐ What are spot contracts, partnerships and joint ventures
- ☐ How to prepare a contract, such as Inco-terms, applicable law, contractual default and how to avoid it and the settlement of disputes
- ☐ Effective implementation of a contract and to manage relationship with supplier successfully
- ☐ Approaches to manage a contract
- ☐ Roles and responsibilities of the contract management team
- ☐ Main indicators of a contract performance and how to deal with risks.
- ☐ How to deal with changes and variations in contracts
- ☐ How to prepare for, and conduct, a negotiation in a professional way
- ☐ The art of questioning, active listening and the use of tactics and different persuasion techniques

### **SCM-704: Business Research Methodology**

#### **(Focus SCM) Course Description:**

No MS program is complete unless Research Element is included in it. Research enables the introduction of new ideas and better utilization of existing framework. It is expected that many students going for this program will have little or no knowledge of research. It is also expected that some of the students may opt for higher education in Supply Chain Management (SCM).

To benefit our MS in SCM we have included this very important course. The focus of study, the examples and preparation of research proposals will be tailored specially for SCM. After studying this course, the students will be more suited to decide their course of action in the third semester, where research thesis is offered.

Course contents will, however, be the same as described in the Red and Blue books of research in Bahria University.

### **SCM-705: Managing Logistics and Inventory in Supply Chain**

#### **Course Description:**

Managing Logistics examines the operational and strategic management of logistics and the role of logistics managers in improving the competitiveness of an enterprise. It explains the most important practical aspects associated with logistics management. Managing logistics means dealing with the processes and operations of importation, internal distribution, scheduling and routing, the selection of transport partners, the choice of logistics equipment and packaging, and the implementation of improvements and cost reductions in the logistics process.

Efficient management of inventories is essential to reducing an enterprise's working capital requirements. This Module will show you how to optimize inventory levels, evaluate opportunities to reduce holding costs and variety of supplies, achieve high levels of internal and external customer service, minimize error rates and achieve international standards of quality and traceability.

### **Course Contents:**

#### **Transportation Management:**

- ☐ Transportation & International Supply Chain
- ☐ International Logistics Infrastructure
- ☐ Methods of entering into foreign markets
- ☐ International Contracts
- ☐ Terms of Trade or Incoterms
- ☐ Terms of Payment & managing Transaction Risks
- ☐ Transportation Regulations, Domestic, regional & Global
- ☐ International Commercial documents & International Insurance
- ☐ International Carriers: Rail, Vehicular, Air, water Vessels, Pipelines, Special Carriers  
Types & Characteristics of each carrier, Standard Operations,
- ☐ Intermodal, Multi-modal transportation & Infrastructure
- ☐ Calculation of Carrier pricing in air, water, vehicular and Rail transportation
- ☐ Transportation Management Information System
- ☐ International Transportation: Foreign Commerce & Mercantile Regulations, Global Intermediaries, Foreign Trade Zones
- ☐ Carrier / shipper relationship
- ☐ Case Studies

#### **Warehouse Management:**

- ☐ The role of warehouse & warehouse manager
- ☐ Types of warehousing: Custom Bonded warehouse, Private warehouse,
- ☐ Warehouse processes: Pick preparation, strategies & equipment, order-picking methods, replenishment & dispatch,
- ☐ Warehouse Management system
- ☐ Warehouse Lay-out
- ☐ Storage & Handling equipment
- ☐ Warehouse costs- Calculations
- ☐ Outsourcing
- ☐ Health & safety
- ☐ Case Studies

#### **Inventory Management:**

- ☐ Basics of Inventory Management
- ☐ Tools of the Trade
- ☐ Forecasting; Basic, Intermediate & Advanced
- ☐ Safety Stock
- ☐ Order Quantities / Lot Sizes
- ☐ Customs Bonded Warehouse Inventory Management & related regulations/SOPs
- ☐ Ordering systems
- ☐ MRP, Multi-Plant MRP & DRP

- ☐ Measurement & Analysis
- ☐ Wendore-managed Inventory & Consignment Inventory

### **SCM-706: Measuring Performance**

#### **Course Description**

Measuring and evaluating performance is a key area which must not be neglected, as it is the basis for continued improvement. To measure performance, it is very important to evaluate what was planned and what has been achieved. It is the other name of monitoring and controlling.

Measuring performance provides practical advice on what to measure and how to evaluate purchasing and supply performance. It includes various examples of specific measurements which are used or adapted to meet company's requirements. It also reviews the process of collecting, analyzing and interpreting evaluation data, and of communicating and obtaining feedback on a performance evaluation.

#### **Course Contents**

- ☐ Evaluating purchasing and supply chain performance
- ☐ Preparation of Work Performance Data, Information and Reports
- ☐ Collecting, analyzing and interpreting evaluation data
- ☐ Improve purchasing & supply effectiveness and efficiency
- ☐ Balanced Scorecard
- ☐ Social return on investment (SROI)
- ☐ How performance measurement can result in process improvement
- ☐ Compilation and updating Organizational Process Assets

### **SCM-707: Procurement (Environmental, Group & Electronic)**

#### **Course Description**

Procurement is one of the most vital parts of supply chain management. Protecting the environment, ensuring cleaner production and aiming at sustainable development have been growing issues during the last decade and will go on being particularly relevant to businesses. Protecting the environment, ensuring cleaner production and aiming at sustainable development have been growing issues during the last decade and will go on being particularly relevant to businesses.

Electronic buying aims to provide an understanding of what e-procurement is, how it can be of value to purchasing organizations, and how to introduce it into a company. This kind of purchasing is now more in practice than the conventional procurement.

#### **Course Contents:**

- ☐ Environment resulting in resource depletion and degradation
- ☐ Cleaner production and green environment
- ☐ Population growth, poverty and related issues
- ☐ Global warming and ozone depletion
- ☐ Solid waste, toxic and hazardous waste
- ☐ Air, water land pollution
- ☐ Benefits of group buying – to both the buyer and seller
- ☐ Study of all the major types of e-procurement tools including catalogues, Internet



- trading exchanges or e-marketplaces, online auctions and e-sourcing.
- ☐ Provide guidelines on how to assess e-procurement needs, develop an e-procurement strategy, select the right e-procurement solution and implement an e-procurement initiative.

### **SCM-708: Customer Relationship Management (CRM) & Operation Management**

#### **Course Description:**

This course aims to provide the user, with an understanding of what CRM (customer relationship management) is, its significance in the modern business environment, and its impact on the way enterprises perceive their customers. It sets out a framework model of CRM that highlights the three main customer-oriented competencies required to be a successful CRM enterprise. It provides practical guidelines that can be turned into immediate actions by any enterprise. It sets out advice for the management of CRM programs once they are established.

Operation Management examines the impact and importance of operations management in organizations and the key role that it plays in improving productivity and competitiveness. The operations function is often at the heart of most organizations and interfaces closely with most other functional areas, notably Purchasing & Supply Chain Management and Marketing. Topics covered include Quality Management, Product and Process design, Facility Location and Layout, Operations Planning and Control and Supply Chain Management.

#### **Course Contents:**

- ☐ Understanding CRM and the role it plays in modern business environment
- ☐ Identify what is the need of the customer and how to get the information
- ☐ Build stronger relationship with customers
- ☐ Integrate CRM strategy with e-Business in the enterprise
- ☐ Establish and manage a CRM
- ☐ Understanding the corporate environment
- ☐ Develop supply strategies
- ☐ Managing logistics in the Supply Chain
- ☐ Specifying Requirement and Planning Supply
- ☐ Managing Inventory
- ☐ Analyzing Supply markets
- ☐ Managing the customer and supplier relationship
- ☐ Managing procurement in supply management

### **SCM-709: Managing Finance along the Supply Chain**

#### **Course Description:**

The management of money, banking, working capital, credit, assets and investments associated with international trade will facilitate imports and exports in the commercial activities of the supply chain. Trade Finance management includes assessing financial needs, methods of payment, financing techniques, planning, sources of finance, business planning, legal implications, and how they impact supply chain management.

### **Course Content:**

- ☐ Fund Flow along the Supply Chain
- ☐ Fund Flow in Reverse Supply Chain
- ☐ Components of Financial Statement
- ☐ Analyzing the Cash Flow Statement
- ☐ Need to evaluate Supply Chain ROI – Return on Investment
  - o Tangible Cost
  - o Indirect Cost
  - o Intangible Cost
- ☐ Operating Efficiency – Profit Margin
- ☐ Asset Use Efficiency – Asset turnover
- ☐ Net Income – Sales
- ☐ Sales – total assets
- ☐ Obstacles to Equitable Distribution among Members
- ☐ Case Studies
  - o Use of Accounting Records
  - o Supply Chain Finance
  - o RFID Implementation

### **SCM-711: Research Thesis**

Standard procedures as specified in the Bahria University Blue Book

### **Elective (Specialization) Courses**

#### **SCM-721: Packaging in Supply Chain**

### **Course Description**

The principle objective of this module is to provide professional purchasing and supply chain managers with sufficient knowledge for them to make informed decisions about the choice of packaging. Packaging is a crucial and integral part of all supply chains — especially those involved with the production and distribution of food products and other fast moving consumer goods. The module also provides the students with an understanding of many of the technical aspects of packaging including the different types of packaging materials, packaging processes, labeling and traceability. What guides the consumer's hand to take the product off the retailer's shelf, peruse it, and then place it in the shopping trolley? The reuse and recycling of used packaging is a major undertaking in most countries today. It is part and parcel of sustainability — the greatest challenge for all those involved in the packaging of products.

### **Course Contents**

- ☐ Relationship between 4 P's and Packaging
- ☐ Product (solution) o Innovation o Protection
  - o Containment
  - o Quality
  - o Meeting Requirements
  - o Safety
  - o Security
- ☐ Price (Value)
  - o Packaging Cost

- o Cost of Goods Sold
- o Value of Money
- ☐ Promotion (information)
  - o Differentiation
  - o Brand Awareness
  - o Image
  - o Communication
  - o Information
- ☐ Place (access)
  - o Supply Chain Aspects
  - o Transportation
  - o Distribution Channels
  - o Direct / indirect Sales

### **SCM-722: Supply Chain Management for SMEs**

#### **Course Description:**

This Module aims to help the leader of a Small and Medium - sized Enterprise (SME) to better manage his or her business's supply chain processes by dealing effectively with understanding supply chains & the importance of effective supply chain management (SCM) for SMEs, setting SCM objectives & strategies, assessing and managing demand, managing the business's operations, managing purchasing & supply, manage the logistics processes, managing the business's relations with its supply chain partners, understanding the supply chain technologies that are relevant to the business, understanding how to monitor and assess the business's supply chain performance.

#### **Course Content:**

- ☐ SCM objectives and strategies
- ☐ Managing Demand
- ☐ Business operations
- ☐ Purchasing and supply
- ☐ Logistics processes
- ☐ Business's relations with its supply chain partners
- ☐ Supply chain technologies
- ☐ Monitoring and assessing the business's supply chain performance

#### **Course Description:**

### **SCM-723: Supply Chain Risk Management**

Supply Chain Risk Management attempts to reduce supply chain vulnerability via a coordinated holistic approach, involving all supply chain stakeholders, which identifies and analyses the risk of failure points within the supply chain. Starting from the placement of order until the final delivery, any known or unknown risk may tarnish the entire procedure. To keep the confidence of the customer, qualitative and quantitative risks must be managed and taken care of. The difference measures can be outsourcing or insurance.

#### **Course Contents:**

- ☐ Risk management plan
- ☐ Creation of risk register
- ☐ Qualitative tools for risk
- ☐ Quantitative tools for risk

- ☐ Managing Risk, avoid, mitigate, accept and transfer risk
- ☐ Monitoring and controlling risk
- ☐ Case studies and scenario based risk identification

### **Course Description:**

#### **SCM-724: Planning Scheduling and Time Management**

All the partners that participate in the supply chain have to work in harmony. Any delay in the case of one can result in the delay in delivery of the goods or services. To manage a professional teamwork, proper planning and creation of time schedule is absolutely necessary. The steps that are necessary to manage professional commitment are briefly described here:

### **Course Content**

- ☐ Breaking down the order to the possible activities
- ☐ Sequencing all activities
- ☐ Creation of a network diagram of all activities
- ☐ Estimation of activity resources – human, machinery & material
- ☐ Estimation of activity duration
- ☐ Creation of time schedule
- ☐ Schedule management

### **Other Elective(s):**

SCM-725 Regularity Framework for Trade Harmonization in International Supply Chain

SCM-726 Mathematical Modeling & Optimization Techniques

SCM-727 Software & Simulations (LOGWARE, TORA, SIMUL8)

## **Commencement of Four Years B.Ed Programme at College of Teacher Education (CTE) by 2016**

### **Executive Summary**

1. There would be two entry points for B.Ed. (Hons) Elementary Program:

- I. After completing FA/F.Sc/A level
- II. After completing BA/BSc.
- III. The 5th semester will be an entry point for those candidates who will be following their two year BS/B.Sc. and wish to join the 4 year B.Ed. program.

After completing this course they will be able to teach up to Elementary Level.

2. There would also be two entry points for B.Ed. (Hons) Secondary Program:

- I. After completing FA/F.Sc/A level
- II. Or after completing BA/BSc.

After completing this course they will be able to teach up to Secondary level.

3. Associate Degree in Education

I. After completing FA/FSc they can get admission in B.Ed four year program but after completing First two years of this program then can be awarded Associate Degree in Education (ADE).

Note: College of Teacher Education has prepared course for three different program but we will run B.Ed. (Hons) Elementary Program. We will take those students who have already done BA/BSc and we will start from 5<sup>th</sup> Semester.

### **The Case**

1. The Institute of Teacher Education (ITE) was established in 2000 on the campus of Pearl Valley Public School Rawalakot with a vision of raising the standards of teachers in English medium schools at grass root level. The Campus is ready with most modern facilities both for curricular and extra-curricular activities. The first course with an intake of 28 trainees was started in October 2005. Since 2008, the ITE is affiliated with Bahria University, Islamabad. In September, 2001 with the foundation and Bahria University's mutual understanding the name of ITE is replaced with College of Teacher of Education (CTE). The Foundation has managed to enlarge the scope of training courses to include B.Ed using English as the medium of communication.

2. The CTE under KEF (Kashmir Education Foundation) was accorded approval for one year B.Ed Programme by Bahria University in its 17th ACM held on 28-29 Dec 2011 for three years and then the programme was to be reviewed to bring it in line with HEC guideline. However, HEC vide their letter No. 9-1/GHQ/Curri/HEC/2013/484 dated 4 Oct 2013 has notified for phasing out of one year B.Ed programme by 2016 and introduction of new scheme of studies for B.Ed entrants having atleast 14 years of education to complete a four year B.Ed (Hons) Elementary and Secondary programme.

3. On the recommendation of National Curriculum Revision Committee (NCRC) of HEC vide letter No. 9-1/GHQ/Curri/HEC/2013/484 dated 4 Oct 2013, HEC has now approved the

revised scheme of studies and curriculum for four years B.Ed (Hons) programme. Since four years B.Ed (Hons) programme does not suite CTE, therefore, HEC was approached by KEF for review of the said decision. Director General Academic, HEC Mr Fida Hussain, vide HEC letter No. 9-1/GHQ/Curri/HEC/2013/434 has notified that NCRC Committee of HEC has reviewed their notification of four year B.Ed (Hons) Programme and has now recommended phasing out of one year B.Ed programme with 4 years B.Ed (Hons) by 2017.

4. A meeting of CTE – KEF committee was held on March 2nd 2016 at the College of Teacher Education Basali Complex Rawalpindi consisting of Ms. Saira Said (Dir E & C), Ms Tahira Said (Director CTE) and Mr. Naeem Gill (Professional Trainer). The committee reviewed the notification to phase out the one year B.Ed programme by 2017. Following agenda items were discussed:

- a. How to introduce/include (4) years B.Ed (Hons) programme in our Academic Schedule.
- b. The curriculum framework and its characteristics for B.Ed (Hons) and ADE.
- c. A brainstorming session to review the challenges being faced to introduce B.Ed (Hons) for Elementary and Secondary degree programme along with Associate Degree Programme and the nature of the education discipline i.e “academic” v.s “professional”.
- d. An overview of the context, courses and perceived characteristics of the B.Ed (Hons) for Elementary and Secondary degree programs along with Associate Degree Program core course, foundation, professional and specialized components.

5. Course of studies prepared by CTE on the basis of the guideline give by HEC (Outline of the B.Ed (Hons) for Elementary and Secondary programme is attached as Annex A). The Chief Executive CTE will present their 4 year B.Ed (Hons) curriculum to Academic Council of BU for approval.

6. The scheme of studies for B.Ed entrants having atleast 14 years education to complete four years B.Ed (Hons) pogramme is essential because the HEC has already notified to phase out one year B.Ed pogramme. Therefore CTE is to abolish the one year B.Ed programme and introduce B.Ed (Hons) programme as desired by HEC.

7. It is recommended that B.Ed (Hons) as desired by HEC be introduced by CTE under KEF to pursue teaching as a career in quality Elementary and Secondary schools of Pakistan. Approval of the scheme of studies and curriculum for four (4) years B.Ed. (Hons) for Elementary and Secondary Degree Programme, alongwith Associate Degree in Education (ADE) after Intermediate (12-year schooling) may be accorded to CTE.

## **Award of Medal to the Students Attending Trimester Programmes**

### **The Case**

1. An Ex student Mr Kaleem Sarwar Reg Number 29950 of BUKC completed his MBA Weekend (2.5 years) in June 2014 on trimester basis. The individual was not awarded gold medal, where after he approached CNS Sectt and Wafaqi Mohtasib (Ombudsman) claiming for the award of Gold Medal as he had achieved first position in the said MBA programme. He also highlighted that during orientation session in 2012 a booklet was given to him where it was mentioned that "MBA weekend students are also eligible for award of medals".
2. Consequently it was clarified to NHQ and Wafaqi Mohtasib that the student was not eligible for award of medal in accordance with BU rules (15th ACM held on 16 - 17 March 2011). NHQ, however, desired to discuss the matter as agenda point in the forthcoming ACM because the decision of 15th ACM was ambiguous and communication gap has been observed w.r.t implementation of the of 15th ACM decision. NHQ has also desired that the decision of forthcoming ACM be communicated to NHQ for perusal of Pro-Chancellor.
3. The student has done MBA Weekend (2.5 years) trimester programme. The rules for award of medal to the students of weekend trimester programme were deliberated in 15th ACM in which it was decided that the award of Gold and Silver Medals will be only for regular programmes. Subsequently, no student belonging to trimester programme has been awarded the medal.
4. As per HEC (draft) policy guidelines, the regular programmes at BU are conducted on bi-semester basis i.e. two regular semester (Fall and Spring), whereas the weekend programme at BUKC is conducted on trimester basis (Spring, Summer and Fall) which is not considered to be a regular programme.
5. Per Semester credit hours load for trimester programmes (12 credit hours in general) is less than the per semester load of regular programmes (15 to 18 credit hours) and as such are not considered for award of medals.
6. The student has quoted Student Handbook 2011-12 in which it is written that MBA weekend students are also eligible for award of medals. Whereas following text is also written in the opening page of Student Handbook 2012 which states that The policies and procedures contained in this book are subject to change from time to time as and when deemed appropriate by the University to fulfill its mission and objectives. The University reserves the right to implement such changes without prior notice. Soft copy of the handbook can be downloaded from [www.bahria.edu.pk](http://www.bahria.edu.pk).
7. Copy of the Student Handbook is always available on Bahria University website. It is responsibility of the students to keep themselves updated with the current rules.
8. It is apparent from the above discussion that students following trimester programme are not eligible for medals and awards. Moreover the decisions of ACMs should be communicated to the students without any delay.

9. The decision of 15th ACM may be amended as follows:

“The award of Gold and Silver Medals will only be to regular programmes comprising of (Spring and Fall Semesters) and not for trimester programmes (Spring, Summer and Fall Semesters)”.



## **In-House Entry Test for PhD Candidates**

### **The Case**

1. Earlier, HEC required all candidates of PhD program must clear the NTS (Subject Test) for admission. In the light of Lahore High Court ruling, HEC revised its policy. Vide HEC letter 1-340/A&C-Law/HEC/2014 dated 27 May 2014, universities were authorized to have their own equivalent entry test for PhD admissions as well.
2. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. There is a consensus that Bahria University should conduct its own test for all candidates willing to take admission into PhD programs.
3. Liberty allowed by the HEC in the light of Lahore High Court decision, BU should avail this opportunity of designing its own entry test for the PhD candidates in order to set its own high quality standard for entry to the PhD program. Hence it is requested for having BU's own admission test for PhD candidate may be approved.

## **Approval of Dropped Courses for Summer Semester**

### **The Case**

1. As per the existing BU policy, students can avail summer semester to study courses in which they have failed or the ones in which they wish to improve their grades. Presently, Students who dropped courses for the reasons like:
  - a. Late entry to the exam
  - b. Short attendance
  - c. Course withdrawn under BU rules
  - d. Others
2. Such students are not allowed to take the same course in summer semester. If dropped courses are allowed to take in summer by the students will facilitate them in managing their courses in time and time bar issues can be resolved up to great extent.
3. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. There is a consensus that students should be provided to avail spring semester for the dropped courses along with the failed courses.
4. Hence, it is recommended that students should be allowed to take dropped courses in summer with the recommendation of respective HOD.

**Revision of Common Courses Decision of Academic Council**

**The Case**

1. In September, 2013, the new department titled “Humanities and Natural Sciences” was established in Karachi Campus through Registrar’s Notification No.20/2013 dated 2nd September, 2013 which would consist of the faculty members teaching following subjects: English, Mathematics, Pakistan Studies and Islamic Studies and it was ratified by the Academic Council under agenda item No.2013 in its 21st meeting held on 30-31 August 2013.
2. In 23rd Academic Council, HOD (MS), Islamabad Campus presented agenda item No.2325 with title “Business English Courses in Management Sciences –Requirements Dedicated Teaching Faculty”.
3. During the discussion it was pointed out by BUKC that the system of pooling the common subjects teaching faculty, including Business English’s, under their Humanities and Natural Sciences Department was working fine and, therefore, required no change.
4. The decision of 23rd Academic Council was “Improve the system in place for pooling up faculty for the common courses under the HSS Department, through better management, communication and inter-departmental coordination. A committee headed by the DIC with HODs as member to strategies improvements and put up report within 10 days”.
5. A report was submitted to 24th Academic Council and the council was satisfied by the progress report.
6. In fall 2016 semester, the problem of common courses was again raised by different departments in the Coordination Meeting of HODs with Director. A committee was constituted on the instruction of Honorable Rector to resolve the issue.
7. A committee was constituted by the DIC consisting of its members HOD (CS), HOD (HSS) and HOD (MS). Committee submitted its report to the Director Islamabad Campus to review the previous decision of Academic Council.
8. The recommendations of the committee were discussed in detailed in the office of DG, Islamabad Campus in presence of all stakeholders and it was decided that the agenda item for academic council may be forwarded with the following recommendations:
  - a. Common courses i.e. English, Pakistan Studies, Islamic Studies, IR, Anthropology, sociology and media studies should be arranged and managed by the department who are offering these courses. Expertise of H&SS department will be used if deemed necessary by other departments.
  - b. Extra regular faculty members of H&SS department may be transferred to other department on the basis of their actual teaching load requirements.
  - c. HOD concerned will be responsible for the evaluation and appraisal of common courses visiting/regular faculty members.
  - d. HOD (H&SS) will provide support to other departments in selection of visiting faculty members as well as curriculum designing.

## **1.5 Years MBA for Students other than Bahria University**

### **The Case**

1. Presently 1.5 Years MBA is offered to BBA Graduates of Bahria University only. Those from other universities have to go through 2 years MBA. This discrimination does not appear to have much justification under the given competitive environments. All the members agreed that all other universities do give admissions to Bahria BBA graduates to their 1.5 Year MBA programs. HEC also does not put any restriction on universities to only accept their won BBA graduates into 1.5 Year MBA program.
2. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. There is a consensus that students other than BU should be allowed to take admission in 1.5 years MBA.
3. It is recommended that 1.5 Year MBA program should be allowed to all BBA Graduates irrespective of their university affiliations.
4. The proposal of offering 1.5 year MBA program to students other than Bahria University may be approved.

## MBA Thesis/Project Rules

### The Case

1. MBA Thesis/Projects Rules were approved by the Academic Council in its 23rd meeting dated 27th & 28th October 2014. The decision No. 2318 reads as:

- a. "Draft MBA Thesis/Project Regulations, as attached at Appendage 2318 (pages 170-181, both inclusive) approved subject to modifying Clause 5 on Qualifications of Thesis/Project Supervisor to reflect that:
- b. The condition of minimum two research papers shall be mandatory.
- c. The supervisor, if PhD, shall be HEC-approved."

2. Matter was submitted before the Academic Council in its 24th meeting dated 27th & 28th May 2015 for compliance report. The Council agreed that the condition of making two research papers for supervisors of MBA theses was impracticable and decided to restore the word "preferably" in clause 5. The Council then dropped the point as well promulgated and actioned. However, some members objected to the use of the word "Project" alongside "Thesis" in the document on the grounds that a project had its own dynamics which were very different from a thesis. The Council found merit in the objection and decided to drop reference to "project" throughout the document. So the decision of the Council was as under:

"Thesis/project supervisor shall be PhD or MPhil/MS/MBA, with preferably two minimum research papers published in national or international HEC recognized journals.

The document is to be retitled "MBA Thesis Rules" and all references to "Project" are to be deleted from the document."

3. In fact, these rules are equally applicable to both thesis and project since they deal with their management rather than anything particularly with their contents. Provisions of these rules like; registration for thesis/project, re-registration in case of non-submission within the prescribed time limit, duration of the thesis/project, assigning the supervisor, Qualification of Thesis/Project Supervisor, Maximum Thesis/Project Supervisory Load, progress report submission, thesis/project submission, evaluation through open defence, role of thesis coordinator and remunerations etc. equally apply to both MBA thesis and MBA project. It is therefore recommended that decision of the 23rd ACM delivered against the agenda point 2318 may be restored and the MBA thesis rules will be held applicable to MBA project as well.

4. The matter was discussed exhaustively by the FBOS and it was concluded that provisions of the rules like; registration for thesis/project, re-registration in case of non-submission within the prescribed time limit, duration of the thesis/project, assigning the supervisor, qualification of the supervisor, maximum supervisory load, progress report submission, thesis submission, evaluation through open defense, role of thesis coordinator and remunerations etc. equally apply to both MBA thesis and MBA project. Accordingly it is unanimously resolved by the house that the decision of the 23rd ACM delivered against the

agenda point 2318 be restored and the rules thus passed be held applicable to MBA thesis as well as MBA project.

5. The matter is recommended to be referred to the Academic Council for final approval.

## **Draft MBA Thesis/Project Rules**

### **1. Preamble**

These Rules called “MBA Thesis/Project Rules” shall apply to all MBA degree programmes conducted in the Constituent and Affiliated Units of Bahria University (BU). These Rules shall be read in conjunction with the general rules/regulations of the University. In matters where these rules are silent, rules/regulations and procedures of BU shall apply. In case of any doubt regarding the interpretation of these Rules and in matters not clearly covered under these and other rules/regulations of BU, the matter shall be referred to the Academic Council for the final decision.

### **2. Definitions**

**“Approved Thesis/Project”** means the thesis completed by the students on prescribed format of Bahria University and approved by the supervisor for submission after conducting plagiarism test.

**“Declaration of Authentication”** means a signed statement by the student showing the thesis/project work being submitted has not been used for any other academic award.

**“First Half Semester Progress Report”** means record of four supervisor-student meetings held during first two months of the semester at suitable intervals and submitted by supervisor to the HOD on the prescribed form at the end of that period.

**“Open Defence”** means an oral examination of the student in the research/project work conducted in the form of presentation and/or demonstration, before the panel of Examiners in the presence of audience, entailing arguments and points supporting the fundamental concepts having been advanced within the thesis/project.

**“Panel Examiner”** means a person with a relevant degree not lower than that of the program of study of the examinee, appointed to conduct his/her thesis/project defense, and is an employee of the BU/industry expert at the time of examination.

**“Project”** means a written description/document of short-term industry related educational assignment necessitating personal initiative, undertaken by a group of students under the guidance of a supervisor.

**“Revised Thesis”** means corrected thesis submitted after having incorporated all suggestions made by panel examiners during thesis defense.

**“Second Half Semester Progress Report”** means record of three supervisor-student meetings held during last two months of the semester at suitable intervals and submitted by supervisor to the HOD on the prescribed form at the time of submission of thesis by the student.

**“Student”** means a person enrolled in MBA program at the BU.

**“Supervisor”** means a person holding a relevant degree not lower than that of the program of study student is pursuing, preferably with two research papers published in national or international HEC recognized journals.

**“Thesis”** means a written description/document of the research work prepared in the format prescribed by BU and submitted as partial requirement of the MBA degree.

**“Thesis/Project Re-registration”** means re-registration by the student in the second part of the thesis constituting 04 credit hours in the subsequent semester after having

been declared failed in the thesis or after having failed to submit the approved thesis within the prescribed time.

**“Thesis/Project Coordinator”** means a faculty/staff member responsible to coordinate all thesis/project work including issuing thesis letters to students and supervisors, giving general guidance to students in the matters relating to thesis/project, maintaining the thesis/project record and arranging open defence.

**“Thesis/Project Duration”** is one semester period wherein the students have to complete and submit thesis/project constituting 04 credit hour research work.

**“Thesis/Project Evaluation Panel”** means panel of two examiners who evaluate performance of the thesis/project students on prescribed form through conducting an open defence.

**“Thesis/Project Supervisory Load”** means maximum number of thesis students or project groups a supervisor can supervise at one time.

**“Thesis/Project Tutorial”** is the theory part of the thesis/project constituting 2 credit hours conducted by a faculty member wherein the students are guided in writing thesis/project and preparing the thesis/project proposal.

**“Thesis/Project Tutor”** is a faculty member who guides the students in preparing the thesis/project proposal in part one of the thesis/project constituting 2 credit hours.

**“Third Examiner”** means a person with a relevant degree not lower than that of the program of study of the examinee, appointed to conduct his/her thesis/project defense, and is an employee of the BU/industry expert at the time of examination.

### **3. Thesis/Project Registration**

Students shall be registering for 2 credit hours out of 6 credit hours in the second last semester of their MBA program. During this semester, students shall be undergoing 30 contact hour tutorials with the thesis/project tutor on thesis writing skills. The tutorials will culminate at preparation of tentative thesis proposal. The research proposal shall be 6-10 pages printed on A-4 size page with double line spacing and using font size 12.

Attendance rules applicable to a course during a semester shall also be applicable to the thesis/project tutorials held in the second last semester.

To become eligible for registration for remaining 4 credit hours in the final semester of the MBA program, the students must have got thesis proposal approved by the thesis/project tutor and the HoD(MS).

During the final semester, the students after having registered themselves for the remaining 04 credit hour, shall undertake research work under the supervision of the thesis/project supervisor assigned to them for that purpose.

The rules relating to registration of a course, withdrawal from a course during a semester and freezing of semester shall also apply to the thesis/project.

### **4. Duration of the Thesis/Project work**

On the pattern of a course, duration of thesis/project work shall be one semester.

If the student is unable to submit the thesis/project duly approved by the thesis/project supervisor and the HoD(MS) on a prescribed form within the deadline announced by the Examination Department, the student shall have to re-register for 4 credit hour thesis/project work during the next semester.

## **5. Thesis/Project Group Strength**

Thesis shall be undertaken on individual basis by the students while project shall be undertaken on group basis. There shall be maximum three students in a project group.

Though students shall work in groups for projects, performance of the group members shall be assessed individually at the time of project evaluation under these rules.

## **6. Assigning the Thesis/Project Supervisor**

Students who have fulfilled the minimum attendance requirement during the thesis tutorials and have got the thesis/project proposal approved shall be assigned thesis/project supervisor by the HoD(MS).

For that purpose, the students shall fill the form placed at Annexure 1 wherein they shall propose two names of full-time faculty members for the thesis/project supervisor. HoD(MS) keeping in view the peculiarity of the topic and the existing workload of the faculty members shall finalize one name as thesis/project supervisor. HoD(MS), however, is competent to assign any other name, if deemed fit.

Students can also propose name(s) of the visiting faculty members or any other external supervisor for thesis/project supervision. However, the HoD(MS) shall seek confirmation from the proposed visiting faculty member before giving approval and shall make sure that the visiting faculty/external member has sufficient research related background and is able to spare due time and attention for the thesis/project supervision.

A letter of appointment containing the student name, thesis title, remuneration and functional and procedural responsibilities relating to thesis/project shall be issued by the HoD(MS) to the research supervisor. The letter sample is placed at Annexure 2.

Thesis student shall also be issued a letter by the HoD(MS) containing name of the thesis/project supervisor assigned and the instructions relating to conducting the thesis/project work. The letter sample is placed at Annexure 3.

Thesis/Project Coordinator shall maintain record of the supervisors, students being supervised and the topics of the theses/projects.

## **7. Qualification of Thesis/Project Supervisor**

Thesis/project supervisor shall be PhD or MPhil/MS/MBA preferably with minimum 2 research papers published in national or international HEC recognized journals.

However, HoD(MS) shall be competent to appoint thesis/project supervisor(s) with Phil/MS/MBA degree who are short of required number of research publications but have sufficient research knowledge and expertise required to supervise MBA thesis/project.

## **8. Maximum Theses/Project Supervisory Load**

A faculty member shall be assigned maximum five thesis/project students to supervise at one time.

However, HoD(MS) shall be competent to assign two extra thesis/project students to a supervisor in special circumstances.

## **9. 1st Half-semester Progress Report**

There shall be at least 7 student-supervisor meetings in one semester time period; four meetings during the first two months and three meetings during the last two months.

Thesis/project supervisor shall maintain record of all meetings and submit 1<sup>st</sup> half-semester progress report of the prescribed form placed at Annexure 4.



In case of an unsatisfactory progress report, the supervisor shall find out the possible reasons for the lack of progress in the research work of the candidate and give his/her remarks in the given space.

## **10. Submission of Thesis/Project**

HOD(MS) shall announce deadline for submission of the approved thesis/project that shall normally be one week before the commencement of the final examination for that semester.

The students shall have to submit three spiral bound copies of their approved thesis/project to the Thesis/Project Coordinator along with the 2<sup>nd</sup> half-semester progress report and thesis/project approval statement by the thesis/project supervisor on prescribed form placed at Annexure 5, within due date.

If a student fails to submit thesis/project within the due date, he/she shall have to re-register for the 4 credit hour thesis/project work during the next semester as provided in the section 2 of these rules.

However, the HoD(MS) shall be competent to grant extension in submission deadline to the students individually up to one week period in some extra-ordinary circumstances, if they apply for it in writing.

## **11. Plagiarism Test**

Before approving the thesis/project for evaluation, thesis/project supervisor shall conduct plagiarism test of the thesis/project report through HEC prescribed plagiarism testing software and shall make sure that similarity index of the thesis/project work is not beyond the range allowed by the HEC.

The thesis/project supervisor shall provide copy of front page of the plagiarism test report to the thesis/project student to make it part of the bound copies of the thesis/project.

## **12. Project Evaluation**

Project evaluation shall start with evaluation by the project supervisor who shall evaluate performance of the group members upon submission of the project individually against the headings given in the Project Evaluation by Supervisor Form placed at Annexure 6.

Subsequently, project shall be evaluated by the two-member panel constituted by the HoD(MS) through open defence normally to be held in the third week of completion of the final examination of the previous semester. While constituting the project evaluation panel, HoD(MS) shall ensure that its members wield sufficient knowledge of the industry projects.

Panel shall evaluate performance of the project group members individually against the headings given in the Project Evaluation by Panel Form placed at Annexure 7.

## **13. Thesis Evaluation**

Thesis shall be evaluated by the two-member panel constituted by the HoD(MS). While constituting the thesis evaluation panel, HoD(MS) shall ensure that its members wield sufficient mix of knowledge of the subject as well as quantitative and qualitative research techniques.

Qualification of the thesis evaluation panel members shall be same as required for the thesis supervisors under these rules.

Thesis shall be evaluated against the headings given in the Thesis Evaluation Form placed at Annexure 8 through an open defence.

## **14. Holding the Open Defence for the Thesis/Project**

Open defence for theses/projects shall normally be held in the third week of completion of the final examination of the previous semester.

Open defence schedule shall contain parallel sessions subject-wise. HoD(MS) shall supervise implementation of the schedule through thesis/project defence administration committee constituted for that purpose.

It shall be mandatory for the thesis/project supervisors and the students currently enrolled in thesis/project to attend the open defence session.

Thesis/Project Coordinator shall ensure that copy of the thesis/project to be evaluated has been provided to both thesis/project evaluation panel members at least three weeks earlier to the open defense date.

## **15. Thesis/Project Evaluation Panel Report**

Final score assigned to the student shall be the average of the scores assigned by both panel members that shall determine grade of the student in thesis in light of the university assessment policy.

However, if both the panel members propose certain amendments in the thesis/project work, the students shall be required to make necessary changes accordingly under supervision of their supervisor and re-submit to the Thesis/Project Coordinator within a period of two weeks, for review by the thesis/project evaluation panel. In such case, another open defense shall not be required.

Furthermore, if both the thesis/project evaluation panel members rule the thesis/project work unsatisfactory then the student shall have to re-register in the 4 credit hour thesis/project in next semester and undertake the research work anew under the supervision of the thesis/project supervisor. In such case, the thesis evaluation shall be held through open defence again.

If it happens that both the thesis/project defence panel members give mutually contradicting findings, the matter shall be referred to the HoD(MS) who shall send the thesis/project to a third examiner for evaluation. In such case, decision of the third examiner shall be final.

## **16. Submission of Hard-bound Copies of Thesis/Project**

Once thesis/project has been approved by the thesis/project evaluation panel, the students shall be asked to submit 2 fair hard-bound thesis/project copies according to the prescribed thesis/project format to the Thesis/Project Coordinator within a period of one week.

One copy of the thesis/project shall be sent to the Examination Department along with the result, one copy shall be placed in library while one copy shall be retained in the Management Sciences Department for record.

## **17. Preparation and Submission of Thesis/Project Result**

Thesis/Project Coordinator shall compile result of successful thesis and project students on the prescribed forms placed at Annexure 9 and Annexure 10 respectively and submit to the Examination Department after having signed by the HoD(MS) and countersigned by the Director Campus.

## **18. Role of Thesis/Project Coordinator**

Thesis/Project Coordinator role shall be assigned to a permanent staff member or a permanent faculty member as an additional responsibility. Responsibilities of the Thesis/Project Coordinator shall include:

Preparing record of thesis/project students and assigning them groups/sections for the thesis/project tutorials

Receiving the thesis/project proposals prepared by the thesis/project students and maintaining their record

Maintaining record of the supervisors assigned to the thesis/project students

Receiving the finally submitted thesis/project from the students and preparing list of such students for thesis/project evaluation

Coordinating with the HoD(MS) in the matters of setting up evaluation committees and holding the thesis/project defence session

Coordinating with the thesis/project evaluation panels and providing them copy of the thesis/project to be evaluated

Collecting the evaluation reports from the thesis/project evaluation committees, compiling the result on the prescribed form and submitting it to the competent authority

Liaising with the HoD(MS) in miscellaneous thesis/project related matters and to troubleshoot the issues faced by the thesis/project students.

## 19. Remunerations

Function	Remuneration		Time of Payment
Thesis/Project Supervisor	PhD	Rs. 6000	To be paid in two installments one each at the time of submission of half-semester progress report
	Phil/MS/MBA	Rs. 5000	
Thesis/Project Evaluation by two-member Panel	Rs. 1000 per member per thesis		To be paid upon submission of result
Thesis/Project Coordinator	Remission of one course from the normal teaching load		-----

## 20. MBA Thesis/Project Forms

All MBA thesis/project related activities shall be executed and concluded using MBA Thesis/Project Forms placed as Annexure 1 to 9. These Forms are to be reformatted and reproduced on A4 sized paper. Under no circumstances, any information is to be added to or deleted from the Forms. Should such a need arise, a request for amendment is to be processed.

**Annexure 1**

**MBA Thesis/Project Supervisor Allocation Form**

Student Name: _____	Registration No: _____
Email: _____	Cell No: _____
Topic: _____ _____	
Proposed Supervisor (1) _____ (2) _____	
Student's Signature: _____ Date: _____	

-----For HOD (MS) Office Use Only-----

Name of Approved Supervisor: _____	
HOD's Signature: _____	Date: _____
Thesis/Project Coordinator's Signature: _____	Date: _____

**Date:** \_\_\_\_\_

Name & Designation: \_\_\_\_\_

Name: \_\_\_\_\_

Registration No. \_\_\_\_\_

Subject: **Appointment as Thesis/Project Supervisor**

Dear \_\_\_\_\_

You have been assigned thesis supervisor to Mr/Ms \_\_\_\_\_ student of MBA program in this department who is registered for the research thesis/project titled \_\_\_\_\_ in the Fall/Spring \_\_\_\_\_ semester. You are offered this assignment on the following terms:

1. The thesis/project work duration will span over one semester for which the student is registered.
2. This contract will be discharged automatically on submission of the thesis/project report.
3. In case of termination of service, each party will have to give an advance notice of 15 days.
4. In order to ensure superior standard of research supervision that has always been a top priority of Bahria University, following guiding principles relating to functional and procedural responsibilities will help:
  - a. Research thesis/project is student's own work, being its sole author under supervisor's mentorship. Supervisor's role in preparation of the thesis is just to be a guide, advisor and critical reviewer rather than co-author or editor.
  - b. There shall be a reverse time-scale prepared in consultation with the student with assigned deadlines for working on various parts of the thesis/project.
  - c. Supervisor is expected to commit the time necessary to allow for maintaining regular contact with the student, which shall normally include at least seven face-to-face meetings during the semester at appropriate intervals for formal discussions and constructive evaluation of progress.
  - d. Supervisor-student meetings shall be regularly recorded on the prescribed form countersigned by the student and submitted to the Head of Department Management Sciences along with progress of the student on the thesis/project work twice a semester as provided in the thesis rules. However, supervisor shall immediately contact the Head of Department Management Sciences in case he/she notes any significant difficulty in progress of the student.
  - e. Supervisor shall ensure thesis/project student had fully read the thesis/project rules and the thesis/project format guidelines. Supervisor shall further ensure that the thesis prepared in accordance with the recommended format only is approved for evaluation.
5. You will be paid Rs. 6000/- (six thousand only) as remuneration for this assignment which will be paid to you in two equal installments, one each at the time of submission of progress report.

If this offer is acceptable to you, please convey us your acceptance immediately by signing on the duplicate copy of this offer.

Sincerely Yours,

**Head of Department  
Management Sciences**

This offer is acceptable to me.

Supervisor' Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Annexure 3**

**Date:** \_\_\_\_\_

Name \_\_\_\_\_

Registration No. \_\_\_\_\_

**Subject: Assigning the Thesis/Project Supervisor**

Dear \_\_\_\_\_

I am pleased to inform you that Dr./Mr./Ms \_\_\_\_\_ has been assigned to you as supervisor for your research thesis titled \_\_\_\_\_. You are advised to follow the guiding principles given below relating to thesis work:

- a. Thesis duration shall span over at one semester; Fall 2014. Students shall have to submit three spiral bound copies of the thesis along with supervisor's statement of thesis approval on or before the deadline announced by the examination department.
- b. Students shall have to re-register themselves for the thesis in next semester if they fail to submit your thesis on or before this deadline.
- c. Student shall develop a reverse time-scale prepared in consultation with the supervisor with assigned deadlines for working on various parts of the thesis.
- d. Student shall be meeting his/her supervisor at least seven times during the semester at suitable intervals. Proceedings of these meetings shall be recorded by the supervisor on the prescribed form countersigned by the student.
- e. Thesis supervisor shall submit report to the Head of Department Management Sciences on these meetings along with the student progress on the thesis work twice during the semester.
- f. Thesis student should recognize that the thesis is solely his/her own work, he/she being its solitary author under mentorship of thesis supervisor. Supervisor's role in preparation of the thesis is just to be a guide, advisor and critical reviewer rather than co-author or editor.
- g. On its completion, ownership of thesis intellectual property rights will be vested with the Bahria University.
- h. Thesis students should fully read the MBA thesis rules and thesis format guidelines available at the Bahria University website. Thesis prepared in accordance with the recommended format only shall be approved for evaluation.
- i. Thesis students should immediately contact the Head of Department Management Sciences in case they note any significant difficulty in progressing with their supervisor.

Looking forward to an excellent research work undertaken by you.

Sincerely,

**Head of Department  
Management Sciences**

I have read the guiding principles given above and fully understand them.

Student's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Annexure 4****MBA Thesis/Project  
1<sup>st</sup> Half-semester Progress Report**

Name of Student	
Registration No.	
Thesis Title	

**Supervisor-Student Meeting Record**

No.	Date	Place of Meeting	Topic Discussed	Signature of Student
1.				
2.				
3.				
4.				

**Progress Satisfactory**☐**Progress Unsatisfactory**☐**Remarks:**

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**Signature of Supervisor:** \_\_\_\_\_ **Date:** \_\_\_\_\_**Name:**

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**Annexure 5**

**MBA Thesis/Project  
2<sup>nd</sup> Half-semester Progress Report & Thesis Approval  
Statement**

Name of Student	
-----------------	--

Name of Student	
Registration No.	
Thesis Title	

**Supervisor-Student Meeting Record**

No.	Date	Place of Meeting	Topic Discussed	Signature of Student
5.				
6.				
7.				

**APPROVAL FOR EXAMINATION**

Candidate's Name: ----- Registration No. -----  
-----

Thesis Title: -----  
-----  
-----

I hereby certify that the above candidate's thesis/project has been completed to my satisfaction and, to my belief, its standard is appropriate for submission for examination. I have also conducted plagiarism test of this thesis/project using HEC prescribed software and found similarity index at ----- that is within the permissible limit set by the HEC for the MBA thesis. I have also found the thesis/project in a format recognized by the Department of Management Sciences.

Supervisor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Name: \_\_\_\_\_

HoD's Signature: \_\_\_\_\_ Date: \_\_\_\_\_



**Annexure 6**

**Project Evaluation by Supervisor Form**

**Name of Student:** \_\_\_\_\_ **Reg. No:** \_\_\_\_\_

**Topic:** \_\_\_\_\_  
 \_\_\_\_\_

Assessment of Research Work	Marks: 60			
	Marks Assigned	Marks Obtained		
		Student 1	Student 2	Student 3
Problem Statement, Issues affecting similar firms Issues affecting the concerned industry	2.5			
Quality of Questionnaire/Survey Data	2.5			
Number and relevance of respondents	2.5			
Relevant literature	2.5			
Research Methodology	2.5			
Analysis (Results & Discussion)	2.5			
Potential to bring changes at the Corporate Level	2.5			
Conclusion, Recommendations	2.5			
Quality of Writing	2.5			
Formatting	2.5			
<b>Total</b>	<b>25</b>			

**Name & Signatures:** \_\_\_\_\_ **Date:** \_\_\_\_\_

(Supervisor)

## Annexure 7

### **Project Evaluation by Panel Form**

(To be completed separately by each member of the Project Evaluation Panel)

**Name of Student:** \_\_\_\_\_ **Reg. No:** \_\_\_\_\_

**Topic:** \_\_\_\_\_

Assessment of Research Work	Marks: 60			
	Marks Assigned	Marks Obtained		
		Student 1	Student 2	Student 3
Problem Statement, Issues affecting similar firms Issues affecting the concerned industry	2.5			
Quality of Questionnaire/Survey Data	5			
Number and relevance of respondents	5			
Relevant literature	5			
Research Methodology	5			
Analysis (Results & Discussion)	10			
Potential to bring changes at the Corporate Level	5			
Conclusion, Recommendations	5			
Quality of Writing	5			
Formatting	2.5			
<b>Total</b>	<b>50</b>			
Assessment of Thesis Defence	Marks: 40			
	Marks Assigned	Marks Obtained		
		Student 1	Student 2	Student 3
Opening / Introduction	2.5			
Logical Progression of Presentation	7.5			
Explanation of Results and Logical Discussion	7.5			
Handling of Questions	5			
Presentation Skills	2.5			
<b>Total</b>	<b>25</b>			

**Name & Signatures:** \_\_\_\_\_ **Date:** \_\_\_\_\_

(Member Evaluation Panel)

**Annexure 8****Thesis Evaluation Form**

(To be completed separately by each member of the Thesis Evaluation Panel)

**Name of Student:** \_\_\_\_\_ **Reg. No:** \_\_\_\_\_

**Topic:** \_\_\_\_\_

<b>Assessment of Research Work</b>	<b>Marks: 60</b>	
	<b>Marks Assigned</b>	<b>Marks Obtained</b>
Problem Statement, Research Question, Research Objectives and Scope	5	
Literature Review (Theories, Conceptual Models and Hypothesis)	10	
Research Methodology	10	
Analysis (Results & Discussion)	15	
Conclusion, Recommendations	10	
Quality of Writing	5	
Formatting	5	
<b>Total</b>	<b>60</b>	
<b>Assessment of Thesis Defence</b>	<b>Marks: 40</b>	
	<b>Marks Assigned</b>	<b>Marks Obtained</b>
Opening / Introduction	10	
Logical Progression of Presentation	10	
Explanation of Results and Logical Discussion	10	
Handling of Questions	5	
Presentation Skills	5	
<b>Total</b>	<b>40</b>	

**Name & Signatures:** \_\_\_\_\_ **Date:** \_\_\_\_\_

(Member Evaluation Panel)

**MBA Thesis Result Form**

Name of Student: \_\_\_\_\_ Reg. No: \_\_\_\_\_

Enrollment No: \_\_\_\_\_ Date: \_\_\_\_\_

Research Work	Year of Entry	Date of Completion	Report (60)	Thesis Defense (40)	Total (100)	Grade
Research Thesis (SDW 698) Cr Hrs: 6						

\_\_\_\_\_  
Thesis Coordinator\_\_\_\_\_  
HOD (MS)**COUNTERSIGNED**\_\_\_\_\_  
Director

**Annexure 10**

**MBA Project Result Form**

Name of Student: \_\_\_\_\_ Reg. No: \_\_\_\_\_

Enrollment No: \_\_\_\_\_ Date: \_\_\_\_\_

Research Work	Year of Entry	Date of Completion	Supervisor (25)	Report (50)	Thesis Defense (25)	Total (100)	Grade
Research Project (SDW 698) Cr Hrs: 6							

\_\_\_\_\_  
Thesis Coordinator\_\_\_\_\_  
HOD (MS)**COUNTERSIGNED**\_\_\_\_\_  
**Director**

**Subject:**        **TRANSFER OF CREDITS – MINIMUM CGPA AND GRADE REQUIREMENT  
IN MBA & MS PROGRAMMES**

1.    **Background to the Case:**

a.    As per existing rules, students of Bachelor programme who have minimum CGPA 2.50 out of 4.00 as per Bahria University grading slab are eligible to apply for transfer of credits from any HEC recognized Higher Education Institution to Bahria University. Minimum CGPA requirement for MS/MPhil transfer of credit cases is 3.0.

b.    Presently Undergraduate rules of Transfer of Credits are implemented on MBA cases whereas for grading scheme and academic penalties it is equated with MS/MPhil programmes i.e passing marks are 60% and degree is awarded with minimum CGPA 2.50.

c.    As per HEC guidelines on Transfer of Credits for Graduate programmes, only those courses can be transferred in which student secured minimum of Grade 'B'.

2.    **Recommendations:**

Minimum CGPA requirement for Transfer of Credits in MBA programme be changed from 2.50 to 3.00.

Minimum grade transferable to Bahria University in MBA programme be changed from C+ to B.

3.    **Establishment/HR effect if any**        Nil

4.    **Financial Effect:**                      Nil

## **Revision of Eligibility Criteria – LLB (5-Year) Program**

### **The Case**

1. The LLB (5-Year) program was started in Fall-2010 (first Batch). The program was approved in the 15th ACM vide Item -14. The eligibility criteria for the program was approved in the same meeting of ACM. As per eligibility criteria the minimum marks in the HSSC/Equivalent exam was set as 45%, which has been implemented in the department since Fall-2010.
2. This low eligibility criteria was to start the program with substantial number of students as with higher percentage some potential students might not qualify for the admission.
3. Now, the department of Law has consolidated the LLB (5-Year) program and is fully established and has seen increased number of applicants for the program. Most of the students admitted to the LLB program has minimum 50% marks in the HSSC/Equivalent exams, therefore it is the right time to raise the eligibility criteria from current 45% marks to 50% marks in HSSC/Equivalent exams.
4. The Agenda Item was discussed in the F-BOS meeting held on 08 March, 2016 through video link. One member suggested that the existing 45% criteria may be maintained to accommodate more students. However, the house approved the proposal.
5. The FBOS approved the Agenda Item.
6. The agenda item was put up before the faculty Board of Studies and was recommended for onward submission to ACM as agenda item. FBOS, recommended the agenda as follows:
7. The eligibility criteria may be raised from 45% to 50 marks in HSSC/Equivalent exam for admission to LLB (5-Year) program from Fall-2016 semester.

## **Transfer of Credit (TOC) in 1.5 years Degree Programs**

### **The Case**

1. According to Bahria University Student Hand Book, credit transfer is not allowed in 1.5 Year program. In spring 2013, BU started MS programmes of 1.5 years duration. Taking an example of Bahria University, other universities have also started similar programs in their campuses. Recently, some students approached from SZABIST, MAJU and COMSATS for transfer of credits to our MS program in BUIC. They would join us provided we allow them TOC facility. The point attracted discussion on some technical aspects and finally recommended for ACM.
2. The point is recommended for approval in upcoming ACM.



## **Late appearance of student in Exams**

### **The Case**

1. There are some cases in which some good students are not able to reach the exam hall within 5 minutes due to some genuine reasons like unforeseen blockage of roads etc.
2. Cases have come forward in which some students having very good track record were not allowed as they were 6 to 7 minutes late to appear in the exam cell.
3. There are courses that are pre requisite to the other courses that are to be offered in for coming semester and thus students are not allowed to register in those courses resulting in delay of their degree.
4. In another extreme instance, student was in his final year and was taking a course that is offered only once a year. The delay of 10 minutes has caused a penalty of an year in the award of his degree. He cannot even get the course offered by paying extra fees for other students.
5. The case was deliberated in DBoS and FBoS and with majority vote, it is recommended for ACM consideration.

### **Recommendations**

6. Deadline time to appear in the exam paper may please be increased from 5 minutes to 15 minutes with no extra time at the end.
7. No student should be allowed to leave the examination hall before half of total allocated exam time.

**Initiated by:** Director Islamabad Campus

**Subject:** **DURATION OF SEMESTER AND CONTACT HOURS**

1. **Background to the Case:**

a. Academic programmes of Bahria University are divided in 02 regular semesters of 18 weeks each where 16 weeks are dedicated for teaching and 02 weeks are reserved for midterm and final examination. Presently 48 contact hours for 03 credit hours course are required to be completed during the semester. As per HEC guide line on the semester system the duration of a regular semester is of 16-18 weeks inclusive of 02 weeks for examinations.

b. Co-curricular activities are an integral part of University life and Bahria University gives due attention to this aspect. However, when such events are conducted during the semesters, at times, they become source of disturbance for the others who are taking classes at that particular time. Even participants find themselves divided between the event and the classes.

2. **Recommendations:**

In order to overcome the problem while remaining within 18 weeks limits of a semester, it is proposed that class room teaching be reduced to 15 weeks (45 contact hours for 3 credit hours course) and one week may be dedicated as students' week. During this week all co-curricular activities may be conducted without disturbing the formal classes

3. **Establishment/HR effect if any** Nil

4. **Financial Effect:** Nil

**DISCUSSION**

## **Separations of Media Studies Dept: from H&SS Dept: at BUIC**

### **The Case**

1. A presentation on strengthening of Media studies at BU campuses at Islamabad and Karachi through video link was given on 11 December 2015 by Dr. Zubair Ghouri, Associate professor at BUIC.
2. The honorable rector chaired the presentation and gave approval for the establishment of an independent department at BUIC and BUKC.
3. It is the need of time to separate Media Studies department from H&SS.
4. Separate Media department be launched from Fall 2016.
5. Following physical infrastructure is required for Media department at BUIC;
  - a. HOD office + PA office
  - b. 04 Classrooms + Media Lab
    - 01 for first semester
    - 01 for second semester
    - 01 for third semester
    - 01 for later on
6. TWO FMs (One PhD and one MS) required.
7. Supporting staff i.e. 1 PA, 1 Computer operator, 1 student Advisor, 1 editor, Two cameramen, 1 producer, 2 office boys.

**Integrating Community Service into Curriculum****The Case**

1. Bahria University has initiated a “Community Support Program” to instil a spirit of service and active citizenship in its students. The Community Support Program deals with the involvement of students in different activities that help in facilitating the deprived ones, generating a sense of responsibility towards their community. The community support program is mandatory for all undergraduate students admitted in Bahria University w.e.f. Spring 2013 in-take. The students have to complete 40 hours of community work during their 4 years of undergraduate studies.

2. Currently, the Student Resource Centre (SRC) deals with the CSP, however, to engage the large number of undergraduate students of Bahria University in meaningful community service initiatives, is extremely difficult to be managed by SRC. Hence, it is proposed that CSP be made a part of the curriculum similar to NUST and Fatima Jinnah Women University, Rawalpindi.

**Recommendations:**

3. The case was presented by HOD (CS) in front of FBOS in its meeting held on 10th March, 2016. After detailed discussions the following are recommended for approval of the Academic Council:

- a. CSP may be integrated into all undergraduate program curriculum as non-credit course preferably in the 3rd or 4th Semester.
- b. SRC may be strengthen to run this CSP activity effectively and efficiently.
- c. CSP may be integrated into the schedule of SRC activities in every semester and should be available to departments before the start of semester to integrate in the time table.
- d. CSP may be registered by the students in Campus Management System as non-credit hours course

4. CSP may be reflected on transcript similar to Internship.

### Activity Based Assessment of “Oral Communication” Course of BBA program

#### The Case

1. Various courses for grooming BBA students have been merged with present academic curricula. Due to their nature, some of the courses differ in both their conduct as well as assessment methodologies. The student assessment of “oral communication” course needs to be based on demonstrated ability of students to perform different tasks. Proposed format for assessment is attached at Appendage 1003.
2. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. There is a consensus that such courses should have different evaluation system than other evaluations. It is recommended that activity-based assessment should be first used in “Oral Communication” and for oral communication course students should be evaluated on activity basis.
3. The introduction of activity-based assessment in the subjects mentioned above may be approved.

#### Annexure

<b>Sessional Marks:</b>	<b>35</b>
<b>Midterm:</b>	<b>25</b>
<b>Class Participation:</b>	<b>05</b>
<b>Final Exam</b>	<b><u>40</u></b>
<b>Total</b>	<b><u>100</u></b>

#### 1. Sessional

a. Individual Presentation	Marks 03
b. Group Presentations	Marks 05
c. Reading Assignment and discussion	Marks 02
d. Role plays	Marks: 10
e. Listening Activity	Marks: 06
f. Impromptu Presentation	Marks: 04
g. Case Analysis	Marks: 05
<i>Sub Total</i>	<i>35</i>

#### 2. Midterm **Marks: 25**

Students shall be evaluated on the basis of the theoretical knowledge they have of the subject. 60% of the course shall be completed before Midterm Examination.

<i>Sub Total</i>	<i>25</i>
------------------	-----------

#### Final Examination

Mock Interviews	Marks: 15
Group Presentations	Marks: 20
<i>Sub Total</i>	<i>35</i>

<b>Participation</b>	<b>Marks: 05</b>
<i>Sub Total</i>	<i>40</i>

<b>Total</b>	<b>100</b>
--------------	------------

## **Approval of the Mission Vision Statements and Objectives of the Institute and Programs Offered at Institute of Professional Psychology**

### **INSTITUTE OF PROFESSIONAL PSYCHOLOGY (IPP)**

#### **Vision**

To become an internationally recognized institute contributing towards the development of nation through excellence in education and research in Professional Psychology.

#### **Mission**

IPP grooms young minds in an excellent academic environment to develop professionals in the field of psychology. Our graduates are capable of meeting their career related to future challenges in the country and abroad. Strong linkages with industry and local and international institutions of psychology facilitate our students and graduates to excel in their career of professional psychology.

#### **Objectives**

The institute aims at providing a competent and abreast educational environment by enhancing international linkages and ensuring students' engagement in community work.

To enhance professional development of the students, by exposing them to first hand experiential knowledge during internship and research projects.

#### **PhD Professional Psychology**

##### **Mission**

The program is designed to provide candidates with opportunities for the development of specialized professional skills through direct involvement in clinical, educational and organizational settings.

##### **Program Objectives**

1. To develop essential diagnostic, therapeutic, and consultative skills through immersion in intensive coursework, internship and field placement.
2. To develop specialized skills related to psychological research and practice.
3. To help candidates develop an understanding of their selves through didactic analysis.

##### **Program Outcomes**

1. Be able to work as professional psychologists, independently or in institutionalized practice.
2. They can be an asset to diagnosis and treatment of patients
3. They can counsel students, parents and teachers in their educational institutions
4. They can conduct personnel selection, appraisal and assessment in an organizational setting.

#### **MS/M.Phil Professional Psychology**

##### **Mission**

The program is designed to provide opportunities for the development of necessary knowledge and skills needed in practice of and the research practices in psychology. The candidates are trained in diagnostic testing, psychotherapy, rehabilitation, educational, vocational counseling, and research under supervision.

### **Program Objectives**

1. To develop important diagnostic, therapeutic, and consultative skills through immersion in intensive coursework, internship and field placement.
2. To enable effective application of counseling and therapeutic practice.
3. Be able to conduct research and practice according to internationally approved standards.

### **Program Outcomes**

After completion of the Program, candidates will be able

1. To teach in educational institutions.
2. To work as professional psychologists in institutionalized practice.
3. Serve as an asset to diagnosis and treatment of patients.
4. To conduct personnel selection, appraisal and assessments in an organizational setting.

### **BSPsychology**

#### **Mission**

The program is designed to provide an opportunity for the development of necessary theoretical knowledge and basic skills needed in supervised practice and research in psychology. The students are trained in oral and written communication skills with special emphasis on how application of psychological knowledge and principles may benefit the individual and society.

### **Program Objectives**

1. To develop a thorough understanding of psychology including theory, practice, and professional ethics.
2. To develop an understanding of skills related to psychological research and practice.
3. To become contributing members in the society by providing community services according to the expertise gained in the program.

### **Program Outcomes**

After completion of the Program, students will be able to

1. Apply main concepts, theoretical frameworks, research findings, and historical concepts in psychology to prepare for their graduate studies or professional work that requires psychological training.
2. Apply basic knowledge of professional practice using psychological assessment, guidelines, and ethical standards of practice to design, participate in, and evaluate applications in a variety of professional settings.
3. Apply their knowledge of psychological behavior for personal development, problem solving, decision making, and effective communication as well as professional interaction in the community and in organizations.
4. Use creative thinking and critical inquiry, utilizing appropriate tools and techniques to solve problems related to current and emerging trends within the sphere of psychology.

## **Uniformity of Vision / Mission / Objectives / Outcomes of MS Department and Programs**

### **The Case**

1. In order to have uniformity of vision and mission etcetera, a committee under HOD, MS, BUKC having members from all the three campuses, was constituted to review the whole process. The committee completed its proceedings and prepared draft vision, mission and objectives of MS Department as well as mission, objectives and outcomes of MBA, MS/MPhil and PhD Program. Proceedings of the committee were presented and discussed in FBOS and passed for processing in ACM. The draft is at Annexure.
2. The point was discussed in combined meeting of FBOS of all campuses of Bahria University. The input was obtained from all the campuses. A unified vision and mission statement was formed. The revised mission and vision of management sciences was approved unanimously by the house.
3. The uniform vision and mission statements of management sciences departments at various campuses of Bahria University is important. This uniformity is also a requirement of NBEAC, the accreditation body of business education programs. Accordingly, the uniform vision and mission of management sciences suggested above may be approved.

### **Annexure**

#### **Vision and Mission of Bahria University**

##### **Vision:**

To become an internationally recognized university that contributes towards the development of nation through excellence in education and research.

##### **Mission:**

To remain committed to the attainment of highest standards in teaching, learning and research, at par with the international standards.

#### **Department of Management Sciences**

##### **Vision:**

To become a leading business school of international repute by contributing in diversified fields of business, management and research for the prosperity of Pakistan and beyond.

##### **Mission:**

MS department promotes academic excellence for grooming young minds as socially responsible management professionals across the country and beyond by promoting emerging business concepts and research attitude in collaboration with the corporate professionals and accomplished entrepreneurs, at the purpose built campuses of the Bahria University.

##### **Objectives:**

- To produce high quality business graduates.
- To produce researchers in the field of business and social development.
- To provide innovative solutions to business and social challenges in Pakistan and beyond.



- To create meaningful collaboration among university, industry and community to address issues and avail opportunities of academic and socio-economic development.
- To promote culture of academic excellence by acknowledging faculty and students' achievements.

## **PhD Programme**

### **Mission:**

PhD programme provides intellectual and physical environment to inquisitive minds to understand the complexities of business and social issues by developing research attitudes. Our PhD scholars are being groomed under the guidance of their mentors for finding innovative yet research based solutions to the business and social issues. The programme strives to promote research culture through its scholars to undertake assignments from business and social organizations, and share their research works.

### **Objectives:**

- To produce high quality business graduates.
- To produce researchers in the field of business and social development.
- To provide innovative solutions to business and social challenges in Pakistan and beyond.
- To create meaningful collaboration among university, industry and community to address issues and avail opportunities of academic and socio-economic development.
- To promote culture of academic excellence by acknowledging scholars' achievements.

### **Outcomes**

- Scholars of our programme shall be part of academic activities by presenting their papers at the national and international forums.
- Our PhD scholars and graduates will be able to create and maintain networks of research at national and international level.
- Our graduates will be able to write papers on business and social issues and get them published in reputed journals.
- Graduates of our programme will be able to provide research based advices to the three sectors of society for their institutions development.

## **MPhil / MS Programme**

### **Mission:**

Our MS program provides an enabling environment to the scholars for gaining research based advanced business management knowledge to identify and probe business issues faced by the society. The programme, in collaboration with the industry, strives to build the scholars' knowledge, skills and attitude relevant to business and societal issues through quality research work and innovative practices.

### **Objectives:**

- To produce MS graduates with specialization in management and its functional areas.
- To engage scholars in research based innovative solutions to the business and social issues.
- To promote research culture in the society through writing for conferences and seminars.

- To play a role in helping the academic, business and social institutions with research expertise.

### **Learning Outcomes:**

- Our MS will be able to participate in academic and research activities by presenting research papers at national and international forums.
- Graduates will be able to create and maintain networks of researchers at the national and international level.
- Graduates will be able to identify business and social issues and provide researched insights through their publications.
- Through MS program, our scholars and faculty members will be able to provide consultations to the business, social and academic institutions for resolving the emerging issues in their relevant fields

### **MBA Programme**

#### **Mission:**

Our MBA program promotes academic excellence to produce future business leaders and entrepreneurs in Pakistan and beyond by providing industry driven curriculum and co-curricular activities. The programme inculcate spirit of applying their knowledge and capabilities among students through experiential learning to resolve business issues in larger interest of business and society.

#### **Objectives:**

- To produce quality MBAs equipped with business and societal knowledge and skills.
- To arouse curiosity to know and resolve the business issues as business manager and leaders.
- To develop students to look critically at business issues and devise pragmatic resolves
- To develop an understanding of the linkages between business and social development.
- To increase the pool of socially responsible business managers and leaders in the society.

#### **Outcomes:**

- Our MBAs will be able to assume and discharge management/leading responsibilities of local/international business enterprises.
- Graduates will be able to promote ethical business practices at the work place.
- They will be able to become entrepreneur themselves or will be able to contribute to the realization of entrepreneurs' business vision.
- Our MBAs will be able to contribute to the development of the academic institutions by undertaking teaching and research responsibilities.
- Our graduates will be part of a dynamic business and social world by becoming active volunteers/members of such networks.

### **BBA Programme**

#### **Mission:**

BBA program promotes business management aptitude among the young minds at state-of-the-art campuses across the country under guidance of renowned academics and corporate

leaders. The program strives to inculcate ethical business practices among our graduates to promote socially responsible businesses for equitable development in the country.

**Objectives:**

- To produce BBA graduates equipped with the business knowledge and skills
- To arouse curiosity of young minds to know the business issues as business manager.
- To develop critical thinking on the business issues and for their pragmatic solutions.
- To expose the students to the changing business environment in Pakistan and abroad
- To increase the pool of socially responsible business executives in the society.

**Outcomes:**

- BBA graduates will be able to execute the concepts of businesses at the work place
- Graduates will be able to participate actively in the business development of firms
- They will be able to become entrepreneur themselves or will be able to contribute to the realization of entrepreneurs' business vision.
- Our graduates will be able to promote work ethics in business organizations

Graduates will be able to pursue higher degrees in the field of education and research in the national and international universities of repute.