IBD/AU/351/3/CS

**M-10**

Director Academics

Approved
Dir.Acad 29/8/25

Dean, Faculty of Computing & AI

Recommended, please. Acr 28/8/25.

1. As per the decision of the 10th Academic Council Meeting, it is instructed to incorporate the following courses into the Scheme of Studies for all non-engineering undergraduate programs, effective from Fall 2025 intake and onwards: Details are given below.

| Sr# | Course Code | Course Title | Prerequisite | Credit Hours | Semester |
|---|---|---|---|---|---|
| **BSCS effective from Fall-25** | | | | | |
| 01 | FQ100 | Fehm-e-Quran I | Nil | 0-1-1 | 1st |
| 02 | FQ101 | Fehm-e-Quran II | FQ100 | 0-1-1 | 2nd |
| 03 | HU115 | Pakistan Studies | Nil | 2-0-2 | 1st |
| **BSIT effective from Fall-25** | | | | | |
| 01 | FQ100 | Fehm-e-Quran I | Nil | 0-1-1 | 1st |
| 02 | FQ101 | Fehm-e-Quran II | FQ100 | 0-1-1 | 2nd |
| 03 | HU115 | Pakistan Studies | Nil | 2-0-2 | 1st |
| **BSBI effective from Fall-25** | | | | | |
| 01 | FQ100 | Fehm-e-Quran I | Nil | 0-1-1 | 1st |
| 02 | FQ101 | Fehm-e-Quran II | FQ100 | 0-1-1 | 2nd |
| 03 | HU115 | Pakistan Studies | Nil | 2-0-2 | 1st |
| **MSCS effective from Fall-25** | | | | | |
| 01 | FQ100 | Fehm-e-Quran I | Nil | 0-1-1 | 1st |
| 02 | FQ101 | Fehm-e-Quran II | FQ100 | 0-1-1 | 2nd |
| **PhDCS effective from Fall-25** | | | | | |
| 01 | FQ100 | Fehm-e-Quran I | Nil | 0-1-1 | 1st |
| 02 | FQ101 | Fehm-e-Quran II | FQ100 | 0-1-1 | 2nd |

2. The revision of the Scheme of Studies (SoS) took place after incorporating suggestions from the Industrial and Academic Advisory Board members, the recommendations of the Departmental Board of Studies meeting held on August 22, 2025, and the Faculty Board of Studies meeting held on August 26, 2025. The SoS was reviewed and

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unanimously approved, with the inclusion of the above three courses in the respective semesters for the BSCS and BSIT programs, and two courses in the MSCS and PhDCS programs.

3. The updated roadmaps have been placed opposite for your reference. It is therefore requested that the revised roadmaps for BSCS, BSIT, MSCS, and PhDCS, effective from Fall 2025, be approved, and that the newly introduced courses be added to the AU automation system to ensure a smooth initiation of courses in Fall 2025.

4. During the NCEAC Zero Visit of BS Bioinformatics program, some suggestions were made by the Program Evaluators. The changes were discussed during the DBS and FBS and have been incorporated into the revised SoS.

5. The case is hereby submitted for approval.

**DR. MEHDI HASSAN**
Tenured Associate Professor
Chair,
Department of Computer Science

Dated: August 28, 2025

# Scheme of Studies (SoS)

# PhD Computer Science

*For Graduates having MS (CS) or Equivalent Degree*

Department of Computer Science
Faculty of Computing and Artificial Intelligence (FCAI)
Air University, Islamabad

# PhD Computer Science Program

The Ph.D. program is designed to prepare students for a career in research. As such, it requires considerable self-directed study and independent research. The Ph.D. program is individually tailored to each student, requiring close cooperation between the student and his or her research adviser. Students are expected to identify their area of research during the first year of study, obtaining a faculty adviser who will agree to supervise the dissertation research.

The PhD program in Computer Science puts emphasis on rigorous coursework and cutting-edge research that should be published in peer-reviewed international conferences and journals. All PhD students are encouraged to tackle both coursework and research in parallel. Success in both these components is a requirement for the award of the PhD degree.

## Degree Title

The title of degree is "**PhD Computer Science**".

## Admission in PhD Computer Science program

### (a) Admission Procedure

An applicant who wishes to enter PhD program of Air University will apply to Admission Office on a prescribed form. The admission office will confirm receipt of application to the applicant once submitted and will communicate further selection procedure to the applicant through web.

### (b) Eligibility Criteria

Admission procedure, eligibility, and other matters related to admission are as follows: -

i. 18 years education with minimum 30 Credit Hours in relevant subjects (Computer Science, Computer Engineering, Software Engineering, Information Technology, Artificial Intelligence, Data Science, Cyber Security, Computer Games Development, Bioinformatics, Information Security.)
ii. 18 years Science and Engineering graduates, or related discipline are eligible to apply but they must cover deficiency courses (6 – 9 CrHrs). Departmental Admission Committee (DAC) will suggest the deficiency courses that needs to be cleared before getting admission in a PhD program.
iii. At least 3.00/4.00 CGPA is required in MS degree
iv. Pass the Air University (equivalent to Graduate record examination GRE/ Higher Education Aptitude test (HAT in relevant Category) with a passing score of 60% OR pass an equivalent test conducted by Air University OR conducted by testing body accredited / recognized by HEC.
v. The candidates who qualify for the Entrance Test will be offered admission while others will be granted provisional admission with a

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condition to clear mandatory requirement of GAT within First Semester.

vi. DAC will conduct interviews for the selected candidates (admission offered) and provide final decision of admission as per the guidelines provided in AU PhD Policy 2023.

**List of deficient courses:**

1. Advanced Analysis of Algorithms
2. Advanced Computer Architecture
3. Advanced Operating Systems
4. Advanced Theory of Automata

**(c) Statement of Purpose**

All applicants are required to submit a statement of purpose (minimum 3000 words) along with the application form, clearly writing their intended research interest and background, and preference/choice of Supervisor where applicable.

**(d) Admission Interview and Offer for Admission**

The applicant will be required to appear for an interview with the department concerned. Applicants will be communicated an Offer of Admission to the PhD program by Admission Office clearly mentioning that the applicant is a fresh applicant, readmission applicant or transfer applicant. Applicants will be required to send their written application before starting the registration process.

1. **Comprehensive Exam (CE)**

PhD student has to appear in the comprehensive exam as per the AU PhD Policy 2023.

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# Program Structure for PhD Computer Science Program

## Distribution of total credit hours

| Semester | Task | Status | Credit Hours |
|---|---|---|---|
| 1 | Coursework* | | 09 |
| 2 | Coursework | Continue | 09 |
| 3 | Comprehensive Exam + Thesis Registration | Continue | 30 |
| 4 | Research Proposal + Research Proposal Defense | | (Continue) |
| 5 | Research + Publication | | (Continue) |
| 6 | Thesis write-up + External Review + Thesis Defense | If not completed | (Continue) |
| 7 | Extension... | | (Continue) |

| Category or Area | Credit Hours |
|---|---|
| PhD Course Work | 18 |
| Research Methodology | 01* |
| PhD Research Credits | 30 |
| Fehm-e-Quran* | 02* |
| **Total Credit Hours** | **51*** |

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*It is mandatory for a student to take the "Research Methodology" course, if he/she did not study this course during Masters. Moreover, it is mandatory to study "Fehm e Quran" if he/she did not study during BS/MS degrees.

*Students must have studied at least half of their course at the 800 level during the degree.

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27/8/25

## Semester Wise Study Plan

| Sr# | Course Code | Course Title | Credit Hours | |
|---|---|---|---|---|
| **Semester –I** | | | | |
| 1. | CSXYZ | Course work (Elective-I) | 3-0-3 | |
| 2. | CSXYZ | Course work (Elective-II) | 3-0-3 | |
| 3. | CSXYZ | Course work (Elective-III) | 3-0-3 | |
| 4. | CS710 | Research Methodology* | 1-0-1 | |
| 5. | FQ100 | Fehm-e-Quran I* | 0-1-1 | |
| **Semester Cr. Hrs.** | | | **10-1-11** | |
| **Semester –II** | | | | **Pre. Req.** |
| 1. | CSXYZ | Course work (Elective-IV) | 3-0-3 | - |
| 2. | CSXYZ | Course work (Elective-V) | 3-0-3 | - |
| 3. | CSXYZ | Course work (Elective-VI) | 3-0-3 | - |
| 4. | FQ101 | Fehm-e-Quran II* | 0-1-1 | FQ100 |
| **Semester Cr. Hrs.** | | | **9-1-10** | |
| **Semester –III** | | | | |
| 1. | Comprehensive Exam | | | |
| 2. | CS899 | Supervised Research (PhD Thesis), comprising research proposal defence and acceptance | 30 | |
| **Semester Cr. Hrs.** | | | **30** | |
| **Semester –IV** | | | | |
| 1. | CS899 | Supervised Research (PhD Thesis), comprising research proposal defence and acceptance | Continue | |
| **Semester Cr. Hrs.** | | | **30 Thesis Credit** | |
| **Semester-V** | | | | |
| 1. | CS899 | Supervised Research (PhD Thesis), comprising research proposal defence and acceptance | Continue | |
| **Semester Cr. Hrs.** | | | **30 Thesis Credit** | |
| **Semester-VI** | | | | |
| 1. | CS 899 | Supervised Research (PhD Thesis), comprising research proposal defence and acceptance | Continue | |
| **Semester Cr. Hrs.** | | | **30 Thesis Credit** | |
| **Semester VII and onwards (Extension if Not Completed)** | | | | |
| 1. | CS899 | Continuation of Supervised Research (PhD Thesis), comprising research proposal defence and acceptance | Continue | |
| **Total Credits** | | | **51*** | |

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*As the choice of elective courses, all doctoral students may undertake at most 2 courses from other departments of the FC&AI as recommended by the Supervisor/GEC/Chair Department. Only relevant graduate level courses or equivalent will be counted towards the coursework requirements of PhD.

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## List of Elective Courses

| S.no | Code | Course Title | Cr. Hrs. |
|---|---|---|---|
| 1. | CS-700 | Advanced Knowledge-based Systems | 3-0-3 |
| 2. | CS-701 | Advanced Data Science | 3-1-4 |
| 3. | CS-702 | Applied Deep Learning | 3-0-3 |
| 4. | CS-703 | Applied Natural Language Processing | 3-0-3 |
| 5. | CS-705 | Advanced Artificial Intelligence | 3-0-3 |
| 6. | CS-778 | Medical Image Analysis | 3-0-3 |
| 7. | CS-750 | Advanced Formal Methods | 3-0-3 |
| 8. | CS-711 | Advanced Topics in Digital Forensics | 3-0-3 |
| 9. | CS-712 | Computational Intelligence | 3-0-3 |
| 10. | CS-717 | Statistical and Mathematical Methods for Data Analysis | 3-0-3 |
| 11. | CS-718 | Computer and Mathematical Modelling | 3-0-3 |
| 12. | CS-716 | Advanced Ethical Hacking | 3-0-3 |
| 13. | CS-731 | Cooperative Communication Networks | 3-0-3 |
| 14. | CS-720 | Applied Quantum Communication | 3-0-3 |
| 15. | CS-726 | Distributed Computing | 3-0-3 |
| 16. | CS-733 | Optimization Theory for Computing | 3-0-3 |
| 17. | CS-734 | Advanced Network Security | 3-0-3 |
| 18. | CS-736 | Network Forensics | 3-0-3 |
| 19. | CS-737 | Advanced Topics in Wireless Networks | 3-0-3 |
| 20. | CS-738 | Internet of Things Design and Application | 3-0-3 |
| 21. | CS-739 | Advanced Wireless Systems and Networks | 3-0-3 |
| 22. | CS-777 | Advanced Geographic Information System | 3-0-3 |
| 23. | CS-762 | Text Mining | 3-0-3 |
| 24. | CS-763 | Advanced Neural Networks | 3-0-3 |

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| | | | |
|---|---|---|---|
| 25. | CS-774 | Advanced Computer Vision | 3-0-3 |
| 26. | CS-890 | Advanced Topics in Image Processing | 3-0-3 |
| 27. | CS-840 | Reinforcement Learning | 3-0-3 |
| 28. | CS-861 | Advanced Topics in Machine Learning | 3-0-3 |
| 29. | CS-851 | Special Topics in Software Engineering | 3-0-3 |
| 30. | CS-876 | Special Topics in Computer Vision | 3-0-3 |
| 31. | CS-840 | Reinforcement Learning | 3-0-3 |
| 32. | CS-836 | Special Topics in Internet of Things | 3-0-3 |
| 33. | CS-835 | Special Topics in Computer Networks | 3-0-3 |
| 34. | CS-826 | Advanced Distributed Computing | 3-0-3 |

*This is the tentative list; additional courses may be added based on faculty expertise and availability.

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