P R O G R A M M E G U I D E

FOR

BACHELOR OF SCIENCE
(INFORMATION TECHNOLOGY)
(OPEN AND DISTANCE M ODE)

DIRECTORATE OF OPEN AND DISTANCE LEARNING
Jamia Hamdard
(Deemed University)
Accredited by NAAC in 'A' category
Hamdard Nagar, New Delhi-110062

Jamia Hamdard

Hakeem Abdul Hameed, the founder of Jamia Hamdard, had a vision to develop Jamia Hamdard into an institution of excellence imparting modern professional education with special emphasis on Unani medicine and Islamic studies. Today, it has evolved into an excellent centre of higher learning, fulfilling the objective of the *wakf*, which has been funding the University ever since its inception.

As a mark of tribute and thanks to the Almighty Allah for bestowing his guiding spirit to its founder and his associates, Jamia Hamdard adopted a seal inscribed with the following

"He (The Prophet may peace be upon him)
Instructs them in the Book and Wisdom"

Ever since the inception of Jamia Hamdard, this holy verse (*ayat*) has been a source of inspiration and guidance for all those associated with its management and administration. As an Islamic charity, *wakf* has played the vital financial role in the making of Jamia Hamdard. The Prophet (PBUH) preached his followers that

"Wisdom is (like) the lost animal of a believer
Wherever he finds it, catches hold of it"

Inspired by the Holy Qur'an and exhorted by the Prophet (PBHU), Muslims became the torch-bearers of knowledge and civilization in the medieval period, but are lagging behind in present times. Late Hakeem Abdul Hameed Sahib wisely chose education and pursuit of knowledge as his prime objective when he decided to convert *Hamdard Dawakhana* into a *wakf*, a charity dedicated to fulfilling educational and health care needs of Indian Muslims. Hamdard (*wakf*) continues to provide generous grant to the university for building, equipments and salaries of staff and other development activities.

Jamia Hamdard was inaugurated by late Shri Rajiv Gandhi, the then Prime Minister of India, on August 01, 1989. In his impressive speech, the Prime Minister applauded the efforts of Hakeem Abdul Hameed Sahib in setting up institutions of higher learning, which were emerging in the form of a "Deemed to be University." He said, "This will enable (the Muslim) minority to go forward and thus help India to march forward."

The University offers professional courses, which equip the students to get placements in the highly competitive job market. On the basis of the record of performance of the University and quality of infrastructure including staff, the university has been accredited by NAAC in category 'A' of the Indian Universities, which is the testimony of healthy practices of the University.

Bachelor of Science (Information Technology) through Open and Distance Mode (Course Code 402)

The B.Sc.(IT) programme is offered through open and distance mode for those students who are not able to afford the expenses of education or who have not been able to make it to the courses offered by the universities and colleges in traditional mode. However, our endeavor is to provide best quality education, keeping with the traditions of Jamia Hamdard, through the selected study centres spread over the various parts of the country and abroad.

Objective

To prepare highly skilled professionals with a strong conceptual and theoritical background in the field of Computer Science and Information Technologies.

The Course

Highlights of the course are described in the following table:

a.	Name of the C ourse	Bachelor of Science (Information Technology
b.	Nature	Open and Distance Mode
c.	Duration	Minimum: Three Years (6 Semesters of six Months each) Maximum: Six Years
d.	Medium of Instruction and Examinations	English
e.	**Eligibility Criteria**	
	Educational Requirements	S.S.C, Intermediate or Equivalent (recognized by Jamia Hamdard) under 10+2 system of education, with **mathematics** compulsorily as one of the subjects.
f.	Commencement of the course	July/ August of every year
g.	**Special Feature**	After completing the course the student has the scope to either pursue MCA, M.Sc. (Computer Science/ IT) programme or take up a job in the IT industry.
h.	Mode of Admission	As per the norms prescribed by Jamia Hamdard from time to time.
i.	Period of Completion (Span Period)	Not more than 06 years

The Curriculum

Highlights of the curriculum of B.Sc. (IT) are described in the following table:

a.	Total number of Semesters and examinations	(06 Minimum) While the teaching/ counselling of the courses will be done on the Semester pattern, the examinations will be held only once a year for all the papers taken in the last two semesters along with any backlogs or improvement papers.
	Major Project	In the 6th Semester of the Program
b.	Total Theory Papers Total Lab Papers Major Project	20 Nos. (2000 marks) 05 Nos. (500 marks) 01 No. (500 marks), in 6th Semester
c.	Theory Papers / Semester	04 Nos. (400 marks), except in the 6th Semester
	Lab Papers / Semester	01 No. (100 marks) except in the 6th Semester
d.	Counselling Hours for theory papers	30 Hours per theory paper of 4 credits each
e.	Practical Sessions	10 sessions of 3 hours each for a laboratory course of 4 credits each.

Modes of curriculum transaction include teaching/ counselling at the Study Centres, assignments, tests, presentations, participation in relevant events and regularity.

Course Structure

Course, structure that guides the teaching, practical and associated assessment, of B.Sc. (IT) programme is described semester-wise in the following tables:

Semesterwise Distribution of Courses in B.Sc.(IT)

First Year

B.Sc.(IT) 1st Semester

S.No.	Course Code	Name of the Paper	Credits	Total
BITD 101		Information Technology	4	100
BITD 102		Computer Tools and Architecture	4	100
BITD 103		Discrete Mathematics	4	100
BITD 104		Personal Computer Software	4	100
BITD 105		Lab-I (PC Software)	4	100

B.Sc.(IT) 2nd Semester

BITD 201		Programming Fundamentals	4	100
BITD 202		Programming in 'C'	4	100
BITD 203		Operating Systems	4	100
BITD 204		Lab-Practical in Computer and Languages	4	100
BITD 205		Lab-II (Programme in 'C'	4	100

Second Year

B.Sc.(IT) 3rd Semester

S.No.	Course Code	Name of the Paper	Credits	Total
BITD 301		Relational Database Management System	4	100
BITD 302		VC++	4	100
BITD 303		Computer Networks	4	100
BITD 304		Web Technologies	4	100
BITD 305		Lab-I: Simple V++ Database Application Development	4	100

B.Sc.(IT) 4th Semester

BITD 401		System Analysis Design and Management Information Systems	4	100
BITD 402		Core Java	4	100
BITD 403		Numerical and Statistical Analysis	4	100
BITD 404		XML	4	100
BITD 405		Lab-II: Numerical and Statistical Routineo Development in C	4	100

Third Year

B.Sc.(IT) 5th Semester				
S.No.	**Course Code**	**Name of the Paper**	**Credits**	**Total**
11.	**BITD 501**	**Data Structures in C**	**4**	**100**
12.	**BITD 502**	**Advanced Web Development**	**4**	**100**
13.	**BITD 503**	**Computer Based Optimization Techniques**	**4**	**100**
14.	**BITD 504**	**WAP and WML**	**4**	**100**
15.	**BITD 505**	**Lab-I: Interactive Website Development**	**4**	**100**
B. Sc (IT) 6th Semester				
16.	**BITD 601**	**Project Work**	**20**	**500**

Duration of the Programme
(Minimum-3 Years, Maximum-6 Years)

To fulfill the degree requirements for acquiring the B.Sc (IT), a student may clear all the papers in three years. If a student fails to clear all the requirement of papers in three years he/ she may be permitted to stretch it over a period of another 3 years. Students will have to clear all the papers in a maximum period of six years after admission.

Counseling and Annual Examinations

For the purpose of teaching and counselling, each academic year shall consist of **Two Academic Semesters**, the first referred to as ODD Semester (July -December) and the second as EVEN semester (January-June). Examinations of papers of both the semesters will be held at the end of every EVEN semester.

Format for conducting examinations of Theory and Lab papers, after the conclusion of two semesters (Odd and Even), are presented in the following table:

a.	Mode	(Theory Papers) (Lab Papers)	**Written only** Programming and viva-voce
b.	Duration	(Theory Paper) (Lab Paper)	03 Hours 03 Hours
c.	Examiners	(Theory Paper) (Lab Papers)	Paper setters and evaluators to be decided by the university for each paper from time to time. The University will appoint External examiners for each lab paper for every Study Centre.

Annual Examinations

It will be the responsibility of Students to fill up an examination form that will be made available at all the Study Centers and submit the same along with the prescribed examination fee to the coordinators of study centers within the given time so as to obtain admit card for appearing in the examination. The decision about the examination center will be prerogative of the University.

Provision for unsuccessful candidates

Candidates who fail in one or more subjects will have to reappear for the supplementary examination, which will be conducted along with the term end examination of the subsequent batch. A student will have to clear all the papers in maximum period of six years after admission. After the expiry of this period the learners will have to seek fresh admission.

Award of division to successful candidates

The students will be declared successful on securing 45% of the maximum marks obtained in all the subjects, as per the following criteria

Distinction	75% and above
1st Division	60% and above
2nd Division	Above 45% and below 60%
Fail	Less than 45%

Detailed Syllabus of Bachelor of Information Technology

Semester 1

BITD –101
INFORMATION TECHNOLOGY

Units	Topics
1	Introduction
2	Elements of Electronic Data Processing
3	Number System and Logic Gates
4	Evolution of Computers
5	Hardware Concepts
6	Peripheral Devices
7	Secondary Storage Devices
8	Software Concepts
9	Classification of Programming Languages
10	Operating System: Concepts and Components
11	Introduction to DOS
12	Graphical User Interface and Windows'98
13	Unix

14	Windows NT
15	Communication Concepts
16	Networking Concepts
17	Internet Technology
18	Some Important IT Applications
19	Some Important National Projects

BITD – 102
COMPUTER TOOLS AND ARCHITECTURE

Units	Topics
1	Data, Information and Information System
2	Basic Components of Computer
3	Classification of Computers
4	Computer Architecture: Wit h Special Reference to PC
5	Data Presentations and Digital Logic Circuits
6	Flip-Flops, Counters, Registers and Sequential Circuits
7	Register Transfer and Microoperations
8	Basic Computer Organization and Design
9	Programming the Basic Computer
10	Microprogrammed Control
11	Central Processing Unit
12	Pipeline and Vector Processing
13	I/O Peripherals
14	Memory Organization and Types of Memory
15	Computer Arithmetic
16	Operating Systems
17	Application Software
18	Programming Languages, Classification and Types
19	System Software
20	Word Processing, Spreadsheets and Databases
21	Physical Security and Password Management
22	Viruses, Bombs and Worms
23	Encryption and Decryption

BITD –103
DISCRETE MATHEMATICS

Units	Topics
1	Arithmetic Progression
2	Geometric Progression
3	Harmonic Progression
4	Miscellaneous Series
5	Set Theory
6	Ordered Pairs, Relations & Functions
7	Group Theory
8	Rings and Fields
9	Vector Space
10	Posets and Lattices
11	Boolean Algebra & Its Applications

BITD –104
PERSONAL COMPUTER SOFTWARE

Units	Topics
1	Introduction to Computers
2	Computer Architecture and Organization
3	Software and Disk Management
4	An Overview of MS-DOS
5	File Management in DOS
6	Disk Management in DOS
7	Batch Files and Configuring DOS
8	An Introduction to Windows
9	Windows Accessories
10	Miscellaneous Windows Features

11	Web Features and Browsers
12	Word 97–Basics
13	Editing Documents
14	Proofing Documents
15	Document Enhancement
16	Mail Merge
17	Working With Wizards and Templates
18	Working with Tables and Charts
19	Creating Basic HTML Documents
20	Excel 97 – Basics
21	Editing and Formatting Worksheets
22	Working with Formulae and Cell Referencing
23	Working with Names and Functions
24	Working with Charts
25	Database Management
26	What-If Analysis
27	Creating and Using Macros
28	Web Publishing and Data Sharing
29	An Overview of Computer Viruses

Semester 2

BITD – 201
PROGRAMMING FUNDAMENTALS

Units	Topics
1	Introduction to Computer Based Problem Solving
2	Program Design and Implementation Issues
3	Programming Environment
4	Program Development

5	Programming Languages
6	Programming Aids and Techniques
7	Program Maintenance

BITD –202
PROGRAMMING IN C

Units	Topics
1	Origin and Introduction to C
2	Data Types, Variables and Constants
3	Operators, Type Modifiers and Expressions
4	Basic Input/Output
5	Control Constructs
6	Arrays
7	Functions
8	Pointers
9	Structures
10	Unions
11	Linked list
12	File Handling in C
13	C Preprocessor

BITD – 203
OPERATING SYSTEMS

Units	Topics
1	Introduction
2	Process Management Functions
3	Memory Management Functions
4	Device Management Functions
5	Concurrent Programming
6	DOS
7	Windows 98/2000
8	UNIX
9	Linux
10.	Security

BITD – 204
LAB-PRACTICAL IN COMPUTERS AND LANGUAGES

Practical	Topics
1	Practice of all Internal and External Dos Commands
2	Writing Simple Batch Program
3	Exposure to Windows Environment
4	File and Program Management in Windows
5	Practice of all Unix Commands
6	Writing Simple Shell Script
7	Introduction to Text Editing and Word Processing

8	Exposure to Advanced Features Supported by Some Editors
9	Net Surfing
10	Creation and Usage of E-mail Account
11	Writing Small Program Using C Language
12	Handling of Data Structures in C
13	Familiarizing Mail Account Using Pine

Semester 3

BITD - 301
RELATIONAL DATABASE MANAGEMENT SYSTEM

Units	Topics
1	Overview of DBMS
2	Data Models
3	Relational Model
4	Relational Database Design
5	Structured Query Language
6	Database Implementation Issues
7	Database Architectures
8	Oracle - Technical Introduction

BITD - 302
VC++

Units	Topics
1	VISUAL C++
2	VC++: ACTIVEX AND COM

BITD-303
COMPUTER NETWORKS

Units	Topics
1	Fundamentals of Data Communication
2	Modems

3	Data Transmission Protocol
4	Transmission Media
5	Local Area Network
6	Implementing LAN
7	Extending LAN
8	Data Transmission Networks
9	TCP/IP and the Internet
10	Network Architectures and OSI
11	Routing and Congestion Control

BITD-304
WEB TECHNOLOGIES

Units	Topics
1	Introduction to HTML
2	Commonly Used HTML Commands
3	Lists
4	Graphics
5	Tables
6	Linking Documents
7	Frames
8	More About HTML
9	Java Script
10	The JavaScript Document Object Model
11	Forms Used by a Web Site
12	Cookies

BITD-305

LAB-I: SIMPLE V++ DATABASE APPLICATION DEVELOPMENT

Semester 4

BITD-401

SYSTEM ANALYSIS DESIGN AND MANAGEMENT INFORMATION SYSTEMS

Units	Topics
1	SAD: An Introduction
2	MIS : An Introduction
3	MIS Planning
4	Conceptual Design of MIS
5	System Analysis and Design
6	System Development Life Cycle
7	Feasibility Study
8	System Analysis
9	Documentation Tools and Techniques
10	System Design
11	Output Design
12	Input Design
13	Modular Design and Database Organization
14	Quality Assurance, Testing and Validation
15	Implementation and Maintenance
16	System Security and Audit
17	MIS for Various Business Functions
Appendix A	Glossary of Terms
Appendix B	Model Question Papers

BITD-402

CORE JAVA

Units	Topics
1	Fundamentals of Object-oriented Programming
2	Evolution of Java

3	Java Classes
4	Interfaces and Packages
5	Inheritance
6	Managing Errors And Exceptions
7	Multithreading
8	Java Applets
9	Java Swings
10	Event Handling
11	Java I/O Handling
12	Socket Programming
13	Java Database Connectivity
14	Java Servlets

BITD-403
NUMERICAL AND STATISTICAL ANALYSIS

Units	Topics
1	Introduction
2	Solving Equations
3	Interpolation
4	Curve Fitting
5	Numerical Differentiation and Integration
6	Solving Numerical Differential Equations
7	Introduction to Statistical Computation
8	Probability Distributions
9	Estimation
10	Hypothesis Testing

BITD-404
XML

Units	Topics
1	Introduction to XML
2	Document Type Definitions
3	XML Schema
4	Data Source Objects
5	The Document Object Model
6	XML Style Sheets (XSL)
7	Xlink
8	XML Pointer Language (XPointer)
9	XML Namespaces
10	XPATH and XSLT
11	XML-Scope and Applications
Appendix-I	Quick Reference
Appendix-II	Sample Projects

BITD - 405
LAB -II: NUMERICAL AND STATISTICAL ROUTINEO DEVELOPM

Semester 5

BITD- 501
DATA STRUCTURES IN C

Units	Topics
1	basic concepts
2	arrays
3	linked lists
4	stacks
5	queues
6	trees
7	graphs
8	searching and sorting techniques

BITD-502
ADVANCED WEB DEVELOPMENT

Units	Topics
	Section-A: Active Server Pages
1	Getting Started with Active Server Pages
2	Dissecting Your First ASP Script
3	Working With Variables
4	Understanding VB Script Control Structures
5	Using VB Script Built in Functions
6	Working with Objects
7	Using Response Object
8	Communicating with User
9	Collecting the Form Information
10	Working with the Request Object
11	Maintaining Persistent Information on the Web
12	Debugging ASP Scripts and Handling Errors

BITD - 503
COMPUTER BASED OPTIMIZATION TECHNIQUES

Units	Topics
1	Overview of operations research
2	Linear Programming
3	Linear Programming — Graphical Method
4	Linear Programming — The Simplex Method
5	Linear Programming — Duality and Sensitivity Analysis
6	Transportation Problem
7	Assignment and Travelling Salesman Problem
8	Probability Theory
9	Decision Making
10	Decision Tree and Utility Analysis
11	Integer Programming
12	Revised Simplex Method
13	Dynamic Programming

BITD - 504
WAP AND WML

Units	Topics
1	Introduction to WAP
2	Basic of a Good WAP Application
3	The User Interface
4	WAP Development Tools and Software
5	Working with WML
6	Interactivity: Forms and User Input
7	Adding Functionality with WML Script

8 Database Driven WAP

BITD-505
Lab-I: Interactive Website Development

Semester 6

BITD – 601

Project Work

Students' Support Services

In order to provide individualized support to its students the university has identified a number of Study Centers throughout the country. These Study Centers will be administratively coordinated by Jamia Hamdard. As for as possible the university allot the Study Center opted by the candidate. However, the university may change the Study Center at its convenience without concurrence of the student at any time.

The Study Centers are the contact points for the students on all major aspects of the programme. These include counselling sessions, practicals, library facilities, disseminating information and advise and facilities for audio visual training aids. The Study Centers are also equipped with some reference books on the subjects of this programme. These will be accessible to the students during their visits to the Study Center.

The university may not always be able to communicate to all the students individually. All the important communications will be sent to the Study Centers. The coordinators of the respective Study Centers would display a copy of such important circulars/ notifications on the notice board for the benefit of all the students. Therefore, it is important for all the students to keep in regular touch with the Study Centers so as to get advance information about assignments, submission schedule, examination forms, list of students admitted to particular examination, declaration of results, etc.

Supply of Study Material

One book per course will be supplied to the students as study material. However, the fast pace of computer industry necessitates that students must read some other reference materials. Studying the supplied printed material alone may not be sufficient for the knowledge of the subject. Therefore, it is strongly recommended that the students take the help of other reference materials/ websites for the preparation of their assignments and other examinations.

Counseling Sessions

In distance education, face-to-face contact between the learners and their teachers/ counselors is relatively less and, therefore, is an important activity. The purpose of such a contact is to answer some of the questions and clarify the doubts, which may not be possible through any other means of communication. It also intends to provide an opportunity to meet the fellow students. There are academic counselors at the Study Centers to provide counselling and guidance to the students in the courses that they have chosen for study. Normally, these sessions will be held at the Study Centers during week ends **(Saturdays and Sundays)** or as decided with the mutual convenience of the students and the Study Centre.

It may be noted that the counseling sessions would be very different from the classroom teaching or lectures. Counsellors will not be delivering lectures as in conventional teaching. They will try to help the students to overcome difficulties, which they face while studying for the programme. In these sessions, they must try to resolve their subject-based difficulties and any other related problems.

Before the students go to attend the counselling sessions, they are expected to go through the course materials supplied to them and make a plan of the points to be discussed. Unless they have gone through the Units, they may not find much to be discussed with course counsellors.

Practicals

These practical sessions will be held in Computer Centres, which may or may not be co-located with the Study Centers. In these Computer Centres, the participants will have the facility to see the computer and software packages relevant to the syllabus.

A participant will not be eligible to appear in the Term-End practical examination if the percentage of attendance in practical session falls below 75% He/ She can, however appear for the theory papers.

The facilities for counselling and practicals are, however, not automatically extended after his/ her first semester of study in B.Sc.(IT). Facility for practical sessions in subsequent semesters is at the discretion of this University and is subject to payment of fees by the students.

Jamia Hamdard

(Deemed University)

The Ministry of Human Resource Development, Government of India, granted to Jamia Hamdard, the status of a 'Deemed to be a University', in 1989 under section 3 of University Grant Commission Act, 1956. Since its establishment, Jamia Hamdard has made commendable progress with regard to expansion of facilities for higher learning and diversification of teaching and research programmes in frontier areas of biological Sciences, Unani Tibb, Pharmaceutical Sciences, IT and Management. The University has a strong base of infrastructure for quality teaching and research. On the basis of the

overall assessment of its performance in realizing the university mandate and contributions made by various departments and faculties to the growth of knowledge, National Assessment and Accreditation Council of UGC has accredited the University under category 'A' the Indian Universities. Jamia Hamdard is one of the universities selected by the UGC for promoting education abroad. The university attracts over 10 percent of the total students from over 30 countries. The international corporations and Foreign Governments employ a large number of the University graduates in various capacities, which is the testimony of international recognition of degrees/diplomas awarded by the University.

As a Muslim minority institution under Article 30 (1) of the Constitution of India, the University is committed *inter alia* to improve access and quality of education so as to enable the adult learners to effectively function in the knowledge based economy. In this context, a number of initiatives have been taken to provide high quality of professional education at Undergraduate and Post Graduate levels.

In order to provide opportunities to students for participating in ongoing educational revolution to upgrade the knowledge and skills of working population, entrepreneur and other aspirants of new knowledge, the university has taken initiative to utilize information and communication technologies to extend the reach of education and to enhance quality of education through the use of multi-media methods of teaching and learning. The Directorate of Open and Distance Learning has therefore been established to promote education through open and distance learning systems, which adopt flexible and innovative methods of education to ensure 'independent learning' to anyone, anytime and anywhere. The programmes of the study will be customized to meet the learning requirements of knowledge seekers as well as to ensure that they learn at their own pace and convenience. Towards this end in view, the university has recognized reputed institutes to act as Study Centres for conduct of various job-oriented and professional courses, which effectively meet the requirements of the world of work.