P R O G R A M M E PROJECT REPORT (PPR)

BACHELOR OF COMPUTER APPLICATION (BCA)
(OPEN AND DISTANCE LEARNING MODE)

School of Open And Distance Learning

JAMIA HAMDARD

(Deemed University)

Hamdard Nagar, New Delhi-110062

Jamia Hamdard

Late Janab Hakeem Abdul Hameed sb, 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. He (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 Indian Universities.

Jamia Hamdard is among top 18 universities of India and ranked 1st in the field of Pharmacy and its medical college is ranked 15th by the Govt. of India (HIRF- 2019 ranking)

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. School 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 an one, 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.

Jamia Hamdard is recommended as an "Institute of Eminence" by the Empowered Expert Committee of MHRD.

Mission & Objective

The Study programme aims to provide contemporary education and training to meet the challenges of the evolving global scenario and changing environment in business administration. The objective of the project is to help the students develop ability to apply multi- disciplinary concepts, tools and technique to sole organizational problem.

Jamia Hamdard Mission and Goal in relevance of the programme

Jamia Hamdard's study programmes under ODL are selective and customized to meet the learning requirements of knowledge seekers as well as to ensure that they learn at their own pace and convenience. Within the financial means of University, due care has been taken to keep the cost of education low, so that educationally backward sections can take advantage of University's programmes through ODL mode. This goal in view, the SODL of Jamia Hamdard has made concerted efforts to offer professional and job oriented courses with regular updates of curricula and study material and introduction of tools of Information Technology.

Targeted Group

The distance education has potential to reach to unreached and even marginalized and excluded group of the society such as tribal populations and Muslims women. Jamia Hamdard, SODL programme provides an opportunity to students for acquiring new knowledge and skills that are needed for their development. Jamia Hamdard being in education for a long time has taken initiatives to offer an opportunity to those students who are unable to get on campus education and those who have limited access to educational resources. ODL programme of Jamia Hamdard also envisage to provide an opportunity to girls from Muslim community, who by and large have been left out by the national education endeavors.

School of Engineering Science and Technology

During the last few years the Department of Computer Science has established itself as a well-known entity in the field of IT Education, Research and Consultancy. The training facilities at the department are comparable with the best in the country and provide an ideal environment for running MCA, M.Sc. (Comp. Sc.), BCA, B.Sc. (IT), B.Tech (Comp. Sc/ IT), M.Tech (Comp. Sc.), and Ph.D. programs offered by the department. The right kind of ambience coupled with excellent faculty, lab and other support systems has attracted students from the foreign countries. Many national and multinational IT industries visit the department every year for campus placements.

The department is establishing CISCO Networking Local Academy for the benefit of our students who can be trained on CISCO equipments for the award of CISCO Certificates like CCNA, CCNP etc.

Bachelor of Computer Application through Open and Distance Mode (Course Code 401)

Apart from the full time regular courses, the department has decided to offer these BCA programme 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.

Objective

To prepare highly skilled professionals, with a strong conceptual and theoretical background, in the field of computer theory and its application

The Course

Highlights of the course are described in the following table:

a.	Name of the Course	Bachelor of Computer Applications (B.C.A.)
b.	Nature	Open and Distance Mode
c.	Duration	Minimum: Three Years 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.
f.	Commencement of the course	January / July. Twice in a year
g.	Special Feature	After completing the course, a student may either pursue MCA, M.Sc.(Computer Science/IT) programmers 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
j.	Fees	Rs. 14,000/- per semester

The Curriculum

Highlights of the curriculum of BCA are described in the following table:

a	Total number examinations	While the teaching/counseling of the course will be done in annually, the examinations will be held only once a year for all the papers taken in the last year along with any backlogs or improvement papers. Teaching /counseling of the courses will be
	Major Project	In Final year
b	Total Theory Papers Total Lab Papers Major Project	22 Nos. (2200 marks) 10 Nos. (1000 marks) 01 No. (500 marks),
c	Theory Papers / Lab Papers/	01 No. (100 marks) except in final year
d	Counseling Hours for theory papers	30 Hours per theory paper of 4 credits each
f	Practical Sessions	10 sessions of 3 hours each for a laboratory course of 4 credits each.

Modes of curriculum transaction include teaching/ counselling, assignments, tests, presentations, participation in relevant events and regularity

Course Structure

Semester-wise course structure, guidelines for teaching, practical and associated assessment of BCA/ B. Sc. (IT) programme is described in the following tables:

Course Type	Abbreviation	Credits
Program Core Course	PCC	40
Program Elective	PE	08
Open Elective	OE	08
Foundation Course	FC	12
Ability Enhancement Course	AEC	04
Skill Enhancement Elective	SEE	08
Laboratory	LAB	20
Dissertation	DISS	20
Non-Credit Course	NCC	00
Total Credits		**120**

L – T – P **stands for number of contact hours as Lecture-Tutorial-Practical in a week**.

Semester – I

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 101	Introduction to 'C' Programming	PCC	25	75	100	3-1-0	4
BCA 102	Computer System Architecture	PCC	25	75	100	3-1-0	4
BCA 103	Mathematical Foundation of Computer Science	FC	25	75	100	3-1-0	4
BCA 104	Communication Skills	AEC	25	75	100	2-0-0	2
BCA 105	Media and Information Literacy Communication	AEC	25	75	100	2-0-0	2
BCA 106	'C' Programming Lab	LAB	25	75	100	0-0-4	2
BCA 107	Computer System Architecture Lab	LAB	25	75	100	0-0-4	2
				Total		**13-3-8**	**20**

Semester – II

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 201	Introduction to Data Structures	PCC	25	75	100	3-1-0	4
BCA 202	Data communication and Computer Networks Basics	PCC	25	75	100	3-1-0	4
BCA 203	Fundamental Concepts of Operating Systems	PCC	25	75	100	3-1-0	4
BCA 204	Elementary Physics	FC	25	75	100	3-1-0	4
BCA 205	Data Structures Lab	LAB	25	75	100	0-0-4	2
BCA 206	Unix/Linux Lab	LAB	25	75	100	0-0-4	2
*BCA ES	Environmental Sciences	NCC	25	75	100	2-0-0	0
				Total		**14-4-8**	**20**

***This subject may be taught in both the semesters (Semester-I and Semester-II) at the discretion of the Department. However, Semester Examination will be conducted only at the end of Semester-II**

Semester – III

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 301	Introduction to Object Oriented Programming	PCC	25	75	100	3-1-0	4
BCA 302	Introduction to Database Management System	PCC	25	75	100	3-1-0	4
BCA 303	Discrete Structures	PCC	25	75	100	3-1-0	4
	PE – 1	PE	25	75	100	3-1-0	4
BCA 304	'C++' Programming Lab	LAB	25	75	100	0-0-4	2
BCA 305	Database Management System Lab	LAB	25	75	100	0-0-4	2
				Total		**12-4-8**	**20**

Semester – IV

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 401	Fundamentals of Probability and Statistics	FC	25	75	100	3-1-0	4
BCA 402	Introduction to Artificial Intelligence	PCC	25	75	100	3-1-0	4
	SEE – 1	SEE	25	75	100	3-1-0	4
	OE – 1	OE	25	75	100	3-1-0	4
BCA 403	Artificial Intelligence Lab	LAB	25	75	100	0-0-4	2
BCA 404	Lab based on SEE – 1	LAB	25	75	100	0-0-4	2
				Total		**12-4-8**	**20**

Semester – V

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BCA 501	Fundamentals of Software Engineering	PCC	25	75	100	3-1-0	4
	PE – 2	PE	25	75	100	3-1-0	4
	SEE – 2	SEE	25	75	100	3-1-0	4
	OE – 2	OE	25	75	100	3-1-0	4
BCA 502	Software Engineering Lab	LAB	25	75	100	0-0-4	2
BCA 503	Lab based on SEE – 2	LAB	25	75	100	0-0-4	2
				Total		**12-4-8**	**20**

Semester – VI

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Viva voce	Total		
BCA 601	Industrial Project and Dissertation	DISS	300	200	500	0-0-40	20

Grand Total of Credits = 120

PROGRAMELECTIVES (PE)

PE – 1	
BCA PE311	Introduction to Wireless Communication
BCA PE312	Introduction to Mobile Computing
BCA PE313	Web &E-Commerce Technologies
PE – 2	
BCA PE521	Introduction to Data Mining
BCA PE522	Introduction to Cloud Computing
BCA PE523	Introduction to Data Science and Big data

Skill Enhancement Electives (SEE)

SEE – 1	
BCA SEE411	Internet and Web Technology
BCA SEE412	Programming in Visual Basic

BCA SEE413	Fundamental Concepts of Microprocessor and Arduino Programming
SEE – 2	
BCA SEE521	Introduction to Java Programming
BCA SEE522	Fundamentals of .Net Programming
BCA SEE523	PHP Programming

OPENELECTIVES (OE)

OE – 1	
BCA OE411	Organization Behavior
BCA OE412	Financial Accounting
BCA OE413	Cyber Crimes & Cyber Laws
OE – 2	
BCA OE511	Startup Entrepreneurship
BCA OE512	Concepts of E-Governance and Smart City
BCA OE513	Digital Marketing and E-Commerce

Duration of the Programme

(Minimum-3 Years, Maximum-6 Years)

To fulfill the degree requirements for acquiring the BCA, a student may clear all the papers in three years. If a student fails to clear all the requirement of course in three years he/ she may be permitted to stretch it over a period of another 3 years. In case the student is unable to pass all the courses of BCA programme in 6 years, the students may be permitted to stretch it for another two years. In such cases, the student has to seek readmission as per 'Re-Admission' rules and pay the requisite fees.

Admission

a. A candidate, aspiring for admission to BCA programme, shall have to apply in the prescribed application form that is complete in all respects, on or before the last date of submission.
b. The Admission committee shall display/publish the list of candidates who are declared eligible for admission, after the due approval of the competent authority.
c. Eligible candidates shall have to complete the prescribed formalities, for completion of admission, within the stipulated period of time; otherwise they will forfeit the right to admission.

Semester Teaching and Annual Examination

For the purpose of teaching and counseling, 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.

Prescriptions for conducting examinations of papers, are presented in the following table:

a	Mode (Theory Papers) (Lab Papers)	Written only

b	Duration (Theory Paper) (Lab Paper)	02:30 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.

Semester Examinations

Examinations of all the papers will be held twice in a year. Students will be required to fill up an examination form that will be made available at School of open and Distance Learning. The university would send admit-cards to all the eligible students. Examination fee of Rs. 2,000 will be charged. Admit cards will be issued for examination in the papers for which the student had registered. The decision about the Examination Centers will be the 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 result of the successful candidates shall be classified at the end of the final year of examination on the basis of the aggregate of marks of all subjects (theory, practical and project) secured by the candidate in the I & II year examinations, as indicated below:

Passing percentage	40% & above
II Division	50% & above
I Division	60% & above
Distinction	75% & above in each paper.

Rationalization of weightage for internal assessment and term end examination in programmes offered in SODL :-

1. The Weightage of term- end examination would be 75%.
2. Weightage for Internal Assessment would be 25%.

DETAILED SYLLABUS OF Bachelor of Computer Applications (BCA)

BCAD 101 - INTRODUCTION TO 'C' PROGRAMMING

Unit 1: Basic Concepts of Programming

Programming Fundamentals: Algorithms and Flowcharts, problem solving techniques, stepwise refinement; Programming in C: features of 'C', tokens, data type, operators, expression.

Unit 2: Branching and Looping

Branching Constructs: if-else, switch, conditional operator & goto statements; looping Constructs: white, do-while, for and Jumping statements.

Unit 3: Arrays and Functions

Arrays, string processing, Functions: categories of functions, recursion.

Unit 4: Pointers, Structures, and Unions

Pointers: operations on pointers, pointers & structures; Structures and Unions.

Unit 5: Debugging and File Handling

Development of efficient programs; Debugging, verification and testing of programs. File Management: Defining & opening a file, closing a file, input operations.

BCAD 102 - COMPUTER SYSTEM ARCHITECTURE

Unit 1: Introduction

Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.

Unit 2: Data Representation and Basic Computer Arithmetic

Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, and multiplication and division algorithms for integers.

Unit 3: Basic Computer Organization and Design

Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.

Unit 4: Central Processing Unit

Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine

language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

Unit 5: Memory and I/O Organization
Cache memory, Associative memory, mapping; Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

BCAD 103 - MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Unit 1: Algebra of Matrices
Matrix Algebra including rank, inverse, linear system of equation, Eigen value & Caley Hamilton Theorem; Team working and management.

Unit 2: Introduction to Differential Calculus
Differentiation and partial differentiation, derivative of sum, dot product and cross product of two vectors, gradient, divergence and curl.

Unit 3: Successive and Partial Differentiations
Successive differentiation, libneitz theorem, partial differentiation.

Unit 4: Differential Calculus for curvatures
Curvature, asymptotes, singular points, concavity, points of inflexion and tracing of Cartesian curve, Differential equation of first order.

Unit 5: Coordinate Geometry
System of circles, standard equations and properties of parabola and Ellipse; General equation of second degree in two variables, tracing of conic sections, sphere.

BCAD 104 - COMMUNICATION SKILLS

Unit 1: Grammar, Dictionary, and Thesaurus
Review of English Grammar; Written and Spoken language; Common Errors in language; Punctuation (purpose, role, importance and use); Effective use of dictionary, thesaurus, encyclopedia, OED; Figures of speech.

Unit 2: Language, Phonetics, and Writing
Language Skills (listening, Speaking, Reading, Writing); Meaning what you mean; Listening: Effective and efficient listening in various situations (discussions, lectures,

news, seminars, speech, telephone calls etc.); Speaking: Phonetics, intonation, accent, usage; strategies for a good rhetoric; Reading: Purpose; Comprehension; Tactics and strategies for good reading; Writing: Guidelines for good writing; various writing styles (General and technical writing styles).

Unit 3: Effectiveness and Efficiency in Communication

Communication (purpose, role importance, elements); Effective and efficient communication; role of content, context and language; Spoken and written communication Presentation and delivery; Role of speaker and audience.

Unit 4: Presentation Skills

Style and body language; Discussion and presentation skills of conferences meeting, seminars.

Unit 5: Drafting the Documents

General and Technical documents (correspondence applications, letter, resumes, CV), drafts, essays, memos; minutes, notes, proposals , précis, reports, summary, synopsis, references, table of contents, acknowledgements, prologue, epilogue, revision; Use of Audio-Visual Aids: OHP, Slides, Charts, Computers etc.

BCAD 105 - MEDIA AND INFORMATION LITERACY COMMUNICATION

Unit 1: Media Education and Literacy

Introduction to Media Education, History of Media Education; Perspectives on Media Education: The Inoculation Model, the Demystification Model, the Creative Participation Model.

Unit 2: Information Literacy

Introduction to Information Literacy, The politics of Information Literacy; The fellow Travelers to Information Literacy, Key moments in the History of Information Literacy.

Unit 3: Leveraging the Power of Computing

Introduction to the History of the Delivery of Computing Power; The Closeness of Computing technology, Mainframes, Micro and Personal Computers; Luggable Computers, Portable Computers, and the Laptop; Pocket Computers, Phones, and the Tablet; Wearable Computing and Augmented Reality Devices.

Unit 4: Digital Media Content

Introduction to Digital Media Content; the nature of Digital Media content; Participatory Culture; Trans media; Converged Content.

Unit 5: Digital Divides

Introduction to Digital Divides; First-Order Digital Devides – Access; Second-Order Digital Devides – Skills; Third-Order Digital Devides – Participation and Outcomes.

BCAD 201 - INTRODUCTION TO DATA STRUCTURES

Unit 1: Data Representation

Representation of data, Data types, ADTs and Data Structures, linear and non – linear data structures.

Unit 2: Arrays, Structures, and Lists

Single and multidimensional arrays, Structures, Static and Dynamic implementation of arrays, Creation, insertion and deletion of linked list, doubly list, circular list etc.

Unit 3: Stack and its operations

Stacks and its application: Definition and examples, Implementing Push and Pop operations, Stack using dynamic memory allocation, Use of stack in problem solving, infix, prefix and postfix notations and conversions, Recursion using stack.

Unit 4: Queues

Queues: Definition and examples, Sequential and dynamic implementation, Implementation of Insert and remove operations.

Unit 5: Tree, Graph, Searching and Sorting

Introduction to tree and graph, Searching techniques: Linear Search, Binary Search, Sorting: Bubble Sort, Quick Sort, Merge Sort, Insertion Sort, Selection Sort.

BCAD 202 - DATA COMMUNICATION AND COMPUTER NETWORKS BASICS

Unit 1: Introduction to Computer Networks

Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite;

Unit 2: Introduction to Data Communication

Analog and digital signal; data-ratelimits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

Unit 3: Arrays and Functions

Circuit switching; packetswitching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

Unit 4: Data Link Layer and Multiple Access Protocols

Error detection and error correction techniques;data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet; Routing: routing algorithms; network layer protocolof Internet- IP protocol, Internet control protocols.

Unit 5: Transport and Application Layer Functions and Protocols

Transport services- error and flow control,Connection establishment and release- three way handshake; Overview of DNS protocol; overview of WWW &HTTP protocol.

BCAD 203 - FUNDAMENTAL CONCEPTS OF OPERATING SYSTEMS

Unit 1: Introduction to Operating Systems

Overview of Operating System: Computer System Structure, Operating Systems Structure, Operating System functions; Computing Environments: Traditional Computing, Client-Server Computing, Peer-to-Peer Computing, Web based Computing, and Mobile Computing.

Unit 2: Process Management

Process Management: Process Concept, Process Scheduling, Inter Process Communication, Multithreading; Scheduling Algorithms: FCFS, SJF, RR, and Priority.

Unit 3: Deadlocks and Synchronization

Deadlocks: introduction, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock; Process Synchronization

Unit 4: Memory Management

Memory management: Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation; Virtual Memory Management: Demand Paging, Page Replacement Algorithms, Thrashing.

Unit 5: Storage Management

Storage Management: File System, File Concept, Access Method, Directory and Disk Structure, File Sharing; Secondary-Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Scheduling; I/0 Systems: Overview, I/O Hardware, Application I/O Interface.

BCAD 204 - Elementary Physics

Unit 1: Mechanics

Units and dimensions; Newton's laws; Conservation of linear momentum; Conservative and non-conservative force; Concept of potential energy; Work energy theorem; Periodic and oscillatory motion; Simple harmonic motion: Time period, Frequency, Phase and phase constant, Energy in simple harmonic motion.

Unit 2: Electromagnetism

Coulomb's law; Superposition principle; Concept of electric field and electric potential: Gauss's law, Simple applications of Gauss's law; Electric Current and current density: Ohm's law, Combination of resistors in series and parallel; Salient features of electromagnetic spectrum.

Unit 3: LASER

Conventional sources of light and LASER, Spontaneous emission, Stimulated Emission, Population inversion, Principle of LASER, Einstein's coefficients, Working of helium-neon and Ruby lasers.

Unit 4: Fiber Optics

Total internal reflection, Introduction of fiber optics, Numerical aperture, Step index and graded index fibers, Attenuation and dispersion mechanism, Application of optical fibers.

Unit 5: Elementary Ideas of Semiconductors

Classification of semiconductors: intrinsic and extrinsic semiconductors, Doping, P-type and N-type semiconductors; Band gap: Classification of materials on the basis of band gap, Formation of P-N junction, Depletion width, Forward biased and reverse biased P-N junction, I-V characteristics; Working of Light Emitting Diode (LED) and solar cell.

BCAD 301 - INTRODUCTION TO OBJECT ORIENTED PROGRAMMING

Unit – I: Principles of Object Oriented Programming (OOP)
Concepts of structured and object oriented programming; advantage of OOP methodologies.

Unit – II: Characteristics of OOP languages
Objects, classes, Data Abstraction, Encapsulation, inheritance, reusability, polymorphism and operator overloading, function overloading.

Unit – III: Introduction to C++
Keywords, Data types, Constants, Variables, Expressions and statements, Operators; Control Structures: if, if… else, switch; Repetitive Statements: for, while, do… while; Pointers, arrays and strings.

Unit – IV: Functions in C++
Parameter passing, Friend Functions, Inline Functions, Function Overloading, Operator overloading; Classes and Objects; Constructors and Destructors.

Unit – V: Inheritance
Single Inheritance, Multilevel inheritance, Multiple inheritance, Hierarchical Inheritance, Hybrid Inheritance; Pointers, Virtual Functions and Polymorphism.

BCAD 302 - INTRODUCTION TO DATABASE MANAGEMENT SYSTEM

Unit – I: Introduction & Database System Architecture
Overview of Database Management System, DBMS architecture, Characteristics of database approach, Various views of data, data models, Schemes, data independence, Advantages of DBMS over file processing systems, Responsibility of database administrator, Introduction to Database Languages & Environments.

Unit – II: E-R Modeling
Entity types, Entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, Sub classes; Super classes, inheritance, specialization and generalization.

Unit – III: Relational Data Model
Relational model concepts, relational constraints, relational algebra SQL: SQL queries, programming using SQL. EER and ER to relational mapping: Data base design using EER to relational language.

Unit – IV: Transaction Processing Concepts
Transaction system, testing of serializability, Serializability of schedules, Conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, Checkpoints, deadlock handling.

Unit – V: Data Normalization

Functional Dependencies, Normal form up to 3rd normal form. Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi-version Schemes, Recovery with concurrent transaction.

BCAD 303 - DISCRETE STRUCTURES

Unit – I: Introduction to prepositional calculus

Introduction to prepositional calculus: Statements, logical operations; truth tables of logical identities, Equivalence of logical identities, Tautologies and contradiction, Negation and De Morgan's law, Conditional and biconditional; Introduction to Boolean algebra: Basic definition and theorems, Boolean expressions, Sum-Of-Products form.

Unit – II: Sets and related operations

Cardinality, Union, Intersection, Complement, Difference, Symmetric Difference, Cartesian Product, subset, superset , power set , Venn diagram , Algebra of Sets, Duality; Properties of operators: commutative, associative, distributive; De Morgan's law, Standard sets.

Unit – III: Relations and their properties

Properties of relation: reflexive, irreflexive, symmetric, asymmetric, antisymmetric, transitive; Matrix of relations, relations represented as digraph, Equivalence relation, partition and equivalence class.

Unit – IV: Functions and its properties

Types of functions: One-to-one, onto, into, everywhere defined, Domain and range, Invertible functions, Composition of functions.

Unit – V: Introduction to recurrence relation

Homogeneous and non-homogeneous recurrence relations, Order and degree of a recurrence relation, Formulation of recurrence relations, Characteristic relation, Solution of recurrence relations.

BCAD 304 - DISCRETE STRUCTURES

BCAD 401 - Fundamentals of Probability and Statistics

Unit – I: Overview of Probability

Introduction, Events & Different Types of Events, Addition & Multiplication Law, Conditional Probability, Bayes' Theorem.

***Unit – II:* Probability Distribution**

Random Variables, Expectation of Discrete Random Variables & Its Properties Continuous & Discrete Probability Function, Binomial, Poison & Normal Distribution.

Unit – III: Measures of Central Tendency

Definition, Function & Scope of Statistics, Arithmetic Mean, Weighted A.M., Median, Mode, Geometric & Harmonic Mean and Their Merits & Demerits.

Unit – IV: Measures of Variation

Measures of Variation: Range, The Interquartile Range or Quartile Deviation, Average (Mean), Deviation Standard Deviation, Coefficient of Variation, Skew ness, Moments & Kurtosis.

Unit – V: Correlation and Regression Analysis

Introduction, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient, Regression Analysis: Difference Between Correlation & Regression, Regression Lines, Regression Equations, Regressions Coefficient.

BCAD 402 - INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Unit – I: Overview of Artificial Intelligence

Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success; Scope of Artificial Intelligence, intelligent agents; Expert systems.

Unit – II: Problem Solving

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem, Solving Problems by Searching, heuristic search techniques, constraint satisfaction problems, stochastic search methods.

Unit – III: Game Playing and Knowledge

Minimax, alpha-beta pruning; Knowledge: Definition and importance of knowledge, Knowledge representation, Various approaches used in knowledge representation, Issues in knowledge representation.

Unit – IV: Knowledge Representation and Reasoning

Building a Knowledge Base: Propositional logic, first order logic, situation calculus, theorem proving in First Order Logic; Planning, partial order planning; Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks.

Unit – V: Learning

Overview of different forms of learning, Learning Decision Trees, Neural Networks; Introduction to Natural Language Processing.

BCAD 501 - FUNDAMENTALS OF SOFTWARE ENGINEERING

Unit – I: Software and Software Engineering

The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI)

Unit – II: Software Requirement Analysis

Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.

Unit – III: Software Development Management

Estimation in Project Planning Process, Project Scheduling, Software Risks, Risk Identification, Risk Projection and Risk Refinement, RMMM Plan, Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.

Unit – IV: Design Engineering

Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level.

Unit – V: Software Testing Strategies & Tactics

Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System testing, Black-Box Testing, White-Box Testing and their type.

BCA PE311 (INTRODUCTION TO WIRELESS COMMUNICATION)

Unit – I: Introduction to Basic Principles

Liberalization of communications Industry, Digitalization of content, changes in spectrum management, cellular reuse, drive towards broadband, Evolution of mobile communications, mobile radio systems- Examples, trends in cellular radio and personal communications.

Unit – II: Cellular Concept

Frequency reuse, channel assignment, hand off, Interference and system capacity, tracking and grade of service, Improving Coverage and capacity in Cellular systems. Cellular telephony: frequency reuse principle, transmitting, receiving, roaming, GSM network architecture, GSM channel structure, GPRS.

Unit – III: Mobile radio propagation

Free space propagation model, reflection, diffraction, scattering, link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse model, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, statistical models for multipath fading channels.

Unit – IV: Second Generation and Third Generation Wireless Networks and Standards

WLL, Bluetooth. AMPS, GSM, IS-95 and DECT Satellite networks: orbits, footprint, categories of satellites. Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Capacity of Cellular CDMA and SDMA.

Unit – V: Introducing the Mobile Internet
Key Services for the mobile Internet, Business opportunities. WAP: the Mobile Internet Standard: Challenges and Pitfalls, Overview of the Wireless Application Protocol, Implementing WAP Services: The Wireless Markup Language, Enhanced WML: WML Script and WTAI,

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BCA PE312 (INTRODUCTION TO MOBILE COMPUTING)

Unit – I: Mobile communication Introduction
Mobile computing devices mobile computing function, mobile computing architecture, evaluation of wireless technology (1G, 2G, 3G, 4G technology).

Unit – II: PCS and GSM
PCS Architecture**,** GSM architecture, Location tracking and call setup, Mobility management: Handover Security-GSM, SMS, International roaming for GSM.

Unit – III: GPRS and Packet Data Network
GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Limitations of GPRS, Spread Spectrum technology, Third Generation Networks, Applications on 3G.

Unit – IV: Wireless Networks
Wireless LAN: IEEE 802.11, Standards, Architecture, Services, Mobile Ad hoc Networks: WiFi and WiMAX, Wireless Local Loop, Bluetooth.

Unit – V: Emerging Mobile Communication Technology
Mobile IP, Cellular IP, VoIP, SIP, LTE, 4G goal and architecture.

BCA PE313 (WEB & E-COMMERCE TECHNOLOGIES)

Unit – I: An introduction to Electronic commerce
What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C).

Unit – II: The Internet and WWW
Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Baner, Exchange, Shopping Bots.

Unit – III: Internet Security

Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime (Laws, Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus (How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorisation and Authentication, Firewall, Digital Signature (How it Works).

Unit – IV: Electronic Data Exchange

Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash.

Unit – V: Planning for Electronic Commerce and Internet Marketing

Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites; Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

BCA PE521 (INTRODUCTION TO DATA MINING)

Unit – I: Data Mining Concepts

Data mining primitives, Basics of data mining, Data Mining Functionalities, Classification of Data Mining Systems, Architectures of data mining system.

Unit – II: Association Rules In Large Databases

Association Rule Mining, Mining Single Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases.

Unit – III: Classification And Prediction

Issues Regarding Classification and Prediction, Classification by Decision Tree Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction.

Unit – IV: Cluster Analysis In Data Mining

Types of Data in Cluster Analysis. A Categorization of Major Clustering Methods, Partitioning Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Outlier Analysis.

Unit – V: Data Warehousing and various Issues in Data Mining :

Introduction to Data Warehouse, Data warehousing and its characteristics, Online analytical processing (OLAP), characteristics of OLAP system, Scalability and data management issues in data mining algorithms, measures of interestingness

BCA PE522 (INTRODUCTION TO CLOUD COMPUTING)

Unit – I: Introduction to Cloud Computing

Recent trends in Computing, Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, History of Cloud Computing, Cloud service providers, Benefits and limitations of Cloud Computing.

Unit – II: Cloud Computing Architecture

Comparison with traditional computing architecture (client/server), Services provided at various levels, Service Models- Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), How Cloud Computing Works, Deployment Models such as Public cloud, Private cloud, Hybrid cloud, Community cloud,

Unit – III: Case Studies

Case study of NIST architecture, Case study of Service model using Google App Engine, Microsoft Azure, Amazon EC2, Eucalyptus.

Unit – IV: Service Management in Cloud Computing

Service Level Agreements (SLAs), Billing & Accounting, Comparing Scaling Hardware such as Traditional vs. Cloud, Economics of scaling.

Unit – V: Cloud Security

Network level security, Host level security, Application level security, Data security and Storage- Data privacy and security Issues, Jurisdictional issues raised by Data location, Authentication in cloud computing.

BCA PE523 (Introduction to Data Science and Big data)

Unit – I: Understanding Big Data

What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing fraud and big data, risk and big data ,credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data mobile business intelligence, Crowd sourcing analytics ,inter and trans firewall analytics

Unit – II: NoSQL Data Management

Introduction to NoSQL , aggregate data models ,aggregates ,key-value and document data models, relationships, graph databases, schema less databases ,materialized views, distribution models, sharding , master-slave replication , peer-peer replication,

sharding and replication, consistency , relaxing consistency , version stamps , mapreduce, partitioning and combining , composing map-reduce calculations

Unit – III: Basics Of Hadoop

Data format , analyzing data with Hadoop , scaling out , Hadoop streaming, Hadoop pipes, design of Hadoop distributed file system (HDFS), HDFS concepts, Java interface , data flow, Hadoop I/O, data integrity, compression, serialization, Avro file-based data structures.

Unit – IV: Map Reduce Applications

Map Reduce workflows, unit tests with MRUnit , test data and local tests – anatomy of Map Reduce job run, classic Map-reduce , YARN , failures in classic Map-reduce and YARN, job scheduling , shuffle and sort , task execution, MapReduce types , input formats, output formats.

Unit – V: Hadoop Related Tools

Hbase, data model and implementations, Hbase clients, Hbase examples– praxis.Cassandra ,cassandra data model , cassandra examples , cassandra clients, Hadoop integration. Pig , Grunt , pig data model , Pig Latin , developing and testing Pig Latin scripts. Hive , data types and file formats , HiveQL data definition , HiveQL data manipulation – HiveQL queries

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BCA SEE411 (INTERNET AND WEB TECHNOLOGY)

Unit 1: Introduction to Internet and WWW

Introduction to Internet: History of World Wide Web; Protocols governing the web; Understanding the Internet: syntax of URLs, web page and browsers, search engine; Introduction to Cyber Laws in India.

Unit 2: Internet Applications

Internet applications: FTP, Telnet, Email, Chat; Internet addressing: identification of each computer using domain name and IP addresses, DNS.

Unit 3: Formatting Web Pages

Introduction to HTML, XML, DHTML and CSS; Formatting Web Pages with the help of different HTML tags, HTML table, HTML form; using CSS for formatting different objects; using DHTML for dynamic designing of web page.

Unit 4: JavaScript

Introduction to Javascript: Advantages of Javascript, Javascript Syntax, documents, forms, Datatype, Variable, Array, Operator and Expression, Looping Constructor, Event Handling, cookies.

Unit 5: E-Commerce and emerging trends

E-Commerce and security issues; Emerging trends: Internet telephony, virtual reality over the web, etc.; Intranet and extranet; firewall design issues.

BCA SEE412 (Programming in Visual Basic)

Unit – I: Introduction to VB

Visual & Non-Visual programming, Procedural, Object-Oriented, Object-Based and Event-Driven Programming Languages, VB as Even-Driven and Object-Based Language, VB Environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate window, Default Controls in Tool Box Visual Development and Event Driven programming.

Unit – II: Basics of Programming

Variables: Declaring Variables, Types of variables, Converting Variables Types, User Defined Data Types, Forcing Variable Declaration, Scope & Lifetime of Variables; Constants: Named & Intrinsic, Operators: Arithmetic, Relational & Logic.

Unit – III: Decision Statements in VB

If statement, if-then-else, select-case; Looping Statements in VB: do-loop, for-next, while-wend; Exit statement, Nested Control Structure; Arrays: Declaring and using Arrays, One-dimensional, Two-dimensional and Multi-dimensional Arrays, Static and Dynamic arrays, Array of Arrays.

Unit – IV: Procedures

General & Event Procedures, Subroutines, Functions, Calling Procedures, Arguments - Passing Mechanisms, Optional Arguments, Named Arguments, Functions Returning Custom Data Types Simple Program Development in VB such as Sum of Numbers, Greatest among Numbers, Checking Even/Odd Number, HCF of Two Numbers, Generate Prime Numbers, Generate Fibonacci Series, Factorial of a Number, Searching, Sorting, etc.

Unit – V: VB Objects and Monitoring Mouse Activity

Dialog Boxes, Common Controls, Menus, MDI Forms, Testing, Debugging and Optimization – Working with Graphics.

Monitoring Mouse Activity: File handling, File system controls, File system objects, DLL Servers.

BCA SEE413 (Fundamental Concepts of Microprocessor and Arduino Programming)

Unit – I: Fundamentals of Microprocessor

Fundamentals of Architecture: 8 & 16 bit Microprocessor and Microcontroller and its comparison, Embedded System & its Characterization. 8051 Architecture Family: Block Diagrams, CPU, ALU, Family of Bus, Registers, Pointers. Timing Diagrams and Execution Cycles, Overview of Microprocessor Family, I/O Interfacing.

Unit – II: Instruction Set and programming

Addressing modes: Introduction, Instruction syntax, Data types, Subroutine, Types of Addressing. 8051 Instruction set, Instruction timings, Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction. Assembly language programs, C language programs, Assemblers and compilers.

Unit – III: Introduction to Arduino

Fundamentals of Arduino, Serial Monitoring, Digital and Analog Inputs, Understanding variables, If-Else Statement, comparison Operators and Conditions, While statement, Analog I/O and Serial Communications.

Unit – IV: Programming using Arduino

Arduino Environment, C Programming used for Arduino, ArduinoToolchain, Cross-Compilation, Arduino Sketches, Classes, Pins, Input and Outputs, Debugging, UART protocol, UART parity and Stop.

Unit – V: Applications

Microprocessor: LED, LCD and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing.
Arduino: Traffic Light Count Down Timer, Parking Lot Counter, Weighing Machines, Emergency Light for railways, Security Systems.

BCA SEE521 (Introduction to Java Programming)

Unit – I: Introduction to Java

Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting, Java Methods (Defining, Scope,

Passing and Returning Arguments, Type Conversion and Type and Checking, Built-in Java Class Methods).

Unit – II: Arrays, Strings and I/O

Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects, Manipulating Strings, String Immutability & Equality, Passing Strings To & From Methods, String Buffer Classes. Simple I/O using System out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.

Unit – III: Object-Oriented Programming Overview

Principles of Object-Oriented Programming, Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection.Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes, Autoboxing/Unboxing, Enumerations and Metadata.

Unit – IV: Exception Handling, Threading, Networking and Database Connectivity

Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi-threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resuming threads. Using java.net package, Overview of TCP/IP and Datagram programming. Accessing and manipulating databases using JDBC.

Unit – V: Applets and Event Handling

Java Applets:Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms,Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using the AWT controls, Swing components of Java Foundation Classes such as labels, buttons, textfields, layout managers, menus, events and listeners; Graphic objects for drawing figures such as lines, rectangles, ovals, using different fonts. Overview of servlets

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BCA SEE522 (Fundamentals of .Net Programming)

Unit – I: Introduction to .NET Framework and C#

.NET framework, MSIL, CLR, CLS, CTS, Namespaces, Assemblies The Common Language Implementation, Assemblies, Garbage Collection, The End to DLL Hell - Managed Execution, Name Spaces - Constructor and Destructors, Function Overloading & Inheritance, Operator Overloading, Modifiers - Property and Indexers , Attributes & Reflection API, When to use Console Applications - Generating Console Output, Processing Console Input.

Unit – II: C#.NET and ADO.NET:

Creating Language Features and Creating .NET Projects, Namespaces Classes and Inheritance -, Namespaces Classes and Inheritance -, C, Exploring the Base Class Library -, Debugging and Error Handling -, Data Types -, Exploring Assemblies and Namespaces, String Manipulation ,Files and I/O ,Collections.

Unit – III: Windows Forms and Controls in details

The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs – ToolTips, Apply Inheritance techniques to Forms, Creating Base Forms, Programming Derived Forms, Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls

Unit – IV: Connectivity ASP.NET - Themes and Master Pages:

Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NETValidation Controls, Using the Simple Validations, Using the Complex Validators Accessing Data using ADO.NET.

Unit – V: Managing State:

Preserving State in Web Applications and Page-Level State, Using Cookies to Preserve State, ASP.NET Session State ,Storing Objects in Session State, Configuring Session State, Setting Up an Outof-Process State Server, Storing Session State in SQL Server.

BCA SEE523 (PHP Programming)

Unit – I: Introduction to PHP

Java PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.), PHP with other, technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator. PHP operator Precedence and associativity

Unit – II: Handling HTML form with PHP

Capturing Form Data, GET and POST form methods Dealing with multi value fields, Redirecting a form after submission. PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else), Switch case, while, For, and Do While Loop, Goto, Break, Continue and exit.

Unit – III: PHP Functions

Function, Need of Function, declaration and calling of a function, PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference, Scope of Function Global and Local.

Unit – IV: ConnectivityString Manipulation and Regular Expression

Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String , String Related Library functions, Use and advantage of regular expression over inbuilt function, Use of preg_match(), preg_replace(), preg_split() functions in regular expression.

Unit – V: Array

Anatomy of an Array ,Creating index based and Associative array, Accessing array, Looping with Index based array, with associative array using each() and foreach(), Some useful Library function.

BCA OE411 (Organization Behavior)

Unit – I: Overview of Organization Behavior

Nature, Scope, Definition and Goals of organizational Behaviour, Fundamental Concepts of Organizational Behaviour, Models of Organizational Behaviour, essential attributes, Psychological dimensions and relevance in the emerging society.

Unit – II: Learning

Styles and principles, Skinner, Thorndike and Piaget theories, Conditions of learning; Memory: Short term and long term; Efficient and effective ways in respect of thinking, problem solving and decision making.

Unit – III: Effects of employee attitudes

Personal and Organizational Values, Job Satisfaction, Nature and Importance of Motivation, Achievement Motive, Theories of Work Motivation: Maslow's Need Hierarchy Theory, Mc Gregcrs's Theory 'X' and Theory 'Y.

Unit – IV: Personality and Stress

Models of personality, factors and desirable features of a healthy personality; Basic Needs and their hierarchy: Mallow model and self actualizing personalities; Work stress: Meaning and definition of Stress, Symptoms of Stress, Sources of Stress, Stress management.

Unit – V: Conflict in organization

Nature of Conflict, Process of Conflict, Levels of Conflict - Intrapersonal, Interpersonal, Sources of Conflict, Effect of Conflict, Conflict Resolution, Meaning and types of Grievances & Process of Grievances Handling.

BCA OE412 (Financial Accounting)

Unit – I: Overview of Financial Accounting

Meaning and Nature of Financial Accounting, Scope of Financial Accounting, Financial Accounting & Management Accounting, Accounting concepts & convention, Accounting standards in India.

Unit – II: Basics of accounting

Capital & Revenue items, Application of Computer in Accounting Double Entry System, Introduction to Journal, Ledger and Procedure for Recording and Posting, Introduction to Trail Balance, Preparation of Final Account, Profit & Loss Account and related concepts, Balance Sheet and related concept.

Unit – III: Financial statement analysis

Ratio analysis, Funds flow analysis, concepts, uses, Preparation of funds flow statement, simple problem, Cash flow analysis, Concepts, uses, preparation of cash flow statement, simple problem, Break – even analysis.

Unit – IV: Definition nature and Objective of Financial Management

Long Term Sources of Finance, Introductory idea about capitalization, Capital Structure, Concept of Cost of Capital, introduction, importance, explicit & implicit cost, Measurement of cost of capital, cost of debt.

Unit – V: Concept & Components of working Capital

Factors Influencing the Composition of working Capital, Objectives of working Capital Management – Liquidity Vs. Profitability and working capital policies. Theory of working capital: Nature and concepts. Cash Management, Inventory Management and Receivables Management.

BCA OE413 (CYBER CRIMES & CYBER LAWS)

Unit – I: Introduction to IT laws & Cyber Crimes

Internet, Hacking, Cracking, Viruses, Virus Attacks, Software Piracy.

Unit – II: E-Mail Investigation

E-Mail Tracking, IP Tracking, E-Mail Recovery, Encryption and Decryption methods, Search and Seizure of Computers.

Unit – III: Introduction to Cyber Crime Investigation

Cyber Forensics, Investigation Tools, e-Discovery, Digital Evidence Collection, Evidence Preservation, Forensics Tools and Softwares, Recovering deleted evidences, Password Cracking, Cyber Security.

Unit – IV: Intellectual property, Legal System of Information Technology

Social Engineering, Mail Bombs, Bug Exploits, Law of Intellectual Property: Copy Right Act, Trade and Merchandise Act, Patent Act, Domain Name Disputes, Cyber-Squatting.

Unit – V: International Perspective of Cyber Law

Electronic Data Interchange, EDI: Concept and legal Issues. Electronic Signature Law's of Major Countries, Cryptography Laws, Cyber Law's of Major Countries.

BCA OE511 (Startup Entrepreneurship)

Unit – I: Introduction to Entrepreneurship

Meaning and concept of entrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, agencies in entrepreneurship management and future of entrepreneurship, Meaning of entrepreneur, the skills required to be an entrepreneur, the entrepreneurial decision process, and role models, mentors and support system.

Unit – II: Business Opportunity Identification and Planning

Capturing Business ideas, methods of generating ideas, and opportunity recognition, Preparing a Business Plan: Meaning and significance of a business plan, components of a business plan, and feasibility study

Unit – III: Financing the New Venture

Importance of new venture financing, types of ownership securities, venture capital, types of debt securities, determining ideal debt-equity mix, and financial institutions and banks

Unit – IV: Launching and Managing the New Venture

Choosing the legal form of new venture, protection of intellectual property, and marketing the new venture, Characteristics of high growth new ventures, strategies for growth, and building the new venture capital

Unit – V: Harvesting Rewards

Exit strategies for entrepreneurs, bankruptcy, and succession and harvesting strategy

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BCA OE 512 Concepts of E-Governance and Smart City

Unit – I

E-Government– OVERVIEW,E-Governance and E-Government , E-Governance Definitions E-Government Definitions ,Framework for e-Government versus e-Governance,
E-Government Services,G2G – Government to Government,, Government to Constituents (E-Democracy), E-Government around the World

Unit – II

Government, Governance and Democracy, E-Governance Projects in India, Measures to be considered before going for E-Governance

Unit – III

Smart City overview, Introduction, meaning, features, Concept of Smart Community, Smart Transportation,City typologies, -Sustainable cities,Liveable cities, Intelligent cities.
Smart Building and Home Device , Smart Health, Smart Government, Smart Energy and Water
Cyber security, Safety, and Privacy, Internet of Things, Block chain, Artificial Intelligence, Alternate Reality, Virtual Reality

Unit – IV

International smart cities-European: Copenhagen, Asian: Singapore
UK smart cities initiatives, Initiatives, Birmingham initiatives, London initiatives, Smart Birmingham vs. smart London

Unit – V

Phases, Stages of Project & their Approval Status, Work Breakdown Structure, Project Organization Structure, Planning, Scheduling & CPM,Smart Cities –Global Standards and Performance, Benchmarks, Practice Code, Smart City Planning and Development, Case Studies on PM of Smart Cities

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BCA OE513 (Digital Marketing and E-Commerce)

Unit – I: History, Nature and Impact of E-Commerce

Internet and E-Commerce, The Nature of E-Commerce, Retailing on the Internet, Global E-Commerce, Doing Business on the Internet

Unit – III: E-Commerce Essentials

Distribution in E-Commerce, Customer Service and Web Site Personalization, Advertising for E-Commerce.

Unit – III: Marketing management

Marketing Information Management, Conducting Marketing Research, Creating a Web Site, Fundamentals of Internet Marketing.

Unit – IV: Business Structures and the Business Plan in E-Commerce

Business Structures and Economics in E-Commerce, Revenue Models and the Business Plan in E-Commerce

Unit – V: Marketing Entrepreneurship

Building a Career in E-Commerce, Ethical, Legal, and Social Responsibilities in E-Commerce Risk Management, Financing the Business.

Students' Support Services

The Jamia Hamdard 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 audiovisual training aids. The Jamia Hamdard is also equipped with some reference books on the subjects of this programme. These will be accessible to the students during their visits to the Jamia Hamdard.

The coordinators of the BCA Courses 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 Jamia Hamdard 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. These sessions will be held at the Jamia Hamdard during weekends **(Saturdays and Sundays)**

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**.**

COST ESTIMATE OF BCA PROGRAMME ON DISTANCE MODE

SEMESTER - WISE COST / BENEFIT STRUCTURE

Recurring Expenses (A)	
Number of Courses	7
Number of Counseling Sessions	14
Cost Per Counselling Session	Rs.500.00/hour/Session
Cost Per Course – Counselling Charges	7,000
Total cost of Counseling Sessions for 7 courses	49,000
Administrative Expenditure per Semester	20,000/month
Total Administrative Expenditure / Semester	1,20,000
Total Recurring Expenses (A)	**1,69,000**
Fixed Cost (B) Study Material Development	
Course Development /Course	65,000
Course Development for 32 courses (Writing/editing/vetting Cost)	20,80,000
Total Courses writing for 3year	6,93,333
Total Cost for SLM per student (including course writing and printing)	**3361**

TOTAL COST BCA DISTANCE (PROGRAM)

All Sessions Counselling (A*6 Semester)	2,94,000
Office Expenditure	7,20,000
Total Recurring Expenses (A)	**10,14,000**
Total cost of counseling class per student	**6760**
Cost of one semester Per Student	**10,121**

PROPOSED FEE STRUCTURE

Expected Admissions per semester	150
Fees per semester / per student	14,000
Total Revenue in one Semester	**2,10,00,000**

MODE OF PROGRAM

Admission in a year	Two Batches
First Admission	Jan- June
Second Admission	July-Dec

Total Admission in a Year	300
Total Revenue	**4,20,00,000**

List of Academic Counselors for BCA Programme

S No	Name of the Academic Counsellor	Designation	Qualifications	Experience in Teaching / Research	Area of Specialization	Courses Recommended for Academic Counselling	Mobile Number & Email ID
1.	Dr. Safdar Tanweer	Assistant Professor	Ph.D. (CSE)	13 years	Computer Science & Engineering	BCAD - 601 Project Work	9810465885 safdartanweer@yahoo.com
2.	Dr. Md. Tabrez Nafis	Assistant Professor	Ph.D. (CSE)	11 years	Computer Science & Engineering	BCAD - 103 Computer Mathematics	9953448275 tabrez.nafis@jamiahamdard.ac.in
3.	Dr. Siddhartha Sankar Biswas	Assistant Professor	Ph.D. (CSE)	10 years	Computer Science & Engineering	BCAD - 503 Operating System Administration With Windows 2000	9910115368 ssbiswas1984@gmail.com
4.	Mr. Syed Sibtain Khalid	Assistant Professor	M. Tech. (ECE)	06 years	Electronics and Communication Engineering	BCAD - 601 Project Work	9818719677 Sibtain1977@gmail.com
5.	Mr. Samar Wazir	Assistant Professor	M. Tech. (CSE)	06 years	Computer Science & Engineering	BCAD - 404 Web Technologies	samar.wazir786@gmail.com
6.	Mr. Nafisur Rahman	Assistant Professor	M. Tech. (CSE)	05 years	Computer Science & Engineering	BCAD-202 Operating System	8376026512 nafiis@gmail.com
7.	Mr. Anil Kumar Mahto	Assistant Professor	M. Tech. (CSE)	06 years	Information Technology	BCAD-501 Software Engineering	anil.fiem16@gmail.com
8.	Mr. Tabrej Ahmad Khan	Assistant Professor	M. Tech. (Information Security), Ph.D. (CS) Pursuing	06 years	Information Security	BCAD-302 Objective Oriented Programming in C++ BCAD-401 Numerical and Statistical analysis	9718129289 tabrejsmvdu@gmail.com
9.	Dr. Naseem Rao	Assistant Professor	Ph.D. (ECE)	12 years	Electronics and Communication Engineering	BCAD-104 Principle of Management BCAD-301 Computer System Architecture BCAD-403 Computer Networks	9811468973 naseemjmi0786@gmail.com
10.	Mr. Javed Azmi	Research Scholar	MCA, Ph.D. (CS) Pursuing	05 years (SODL)	Computer Science	BCAD-203 Programming in 'C' BCAD-303	9868063832 jazmi@jamiahamdard.ac.in

						System Analysis and Design	
11.	Mr. Md. Onais Ahmad	Research Scholar	M.Tech. (CSE), Ph.D. (CSE) Pursuing	05 years (SODL)	Computer Science & Engineering	BCAD-105 Lab-I (PC Software) BCAD-201 Programming Fundamentals BCAD-305 Lab-I (C++ Application Development	9910690317 oahmad@jamiahamdard.ac.in
12.	Mr. Md. Rahbre Islam	Technical Assistant	M. Tech. (CSE)	05 years (SODL)	Computer Science & Engineering	BCAD-205 Lab-II (Programming in 'C') BCAD-405 Lab-II: Implementation data structures in C BCAD-505 Lab-I: (Website Development)	9873201515 rislam@jamiahamdard.ac.in
13.	Mr. Abdul Majid Farooqi	Research Scholar	M.Tech. (CSE), Ph.D.(CSE) Pursuing	01 years (SODL)	Computer Science & Engineering	BCAD-101 Computer Fundamentals BCAD - 402 Data Structures in C BCAD -502 Java Programming	9891958565 abdulmajidfarooqi_sch@jamiahamdard.ac.in
14.	Ms. Roshan Jameel	Research Scholar	M.Tech. (CSE), Ph.D.(CSE) Pursuing	04 months	Computer Science & Engineering	BCAD-102 PC Software BCAD - 504 Advanced Web Development	9717168058 roshijameel@gmail.com
15.	Mr. Mehtab Alam	Research Scholar	M. Tech. (CSE), Ph.D.(CSE) Pursuing	----------	Computer Science & Engineering	BCAD - 204 Business System BCAD - 304 Database Application in MS Access	9582232786 mahiealam@gmail.com

FEEDBACK OF THE ODL LEARNERS
TO MONITOR QUALITY OF STUDENT SUPPORT SERVICES PROVIDED TO THE LEARNERS

We are obtaining a feedback from you for improving quality of the academic programmes we offer and also to improve the quality of student support services provided to you at Jamia Hamdard. We request you to please provide the following information related to your studies at Jamia Hamdard in the ODL Programme. The feedback given by you would help us in improving quality of academic programmes on offer and the student support services.

The filled – in feedback form may be submitted to the undersigned by post / in – person at the School of Open and Distance Learning, First Floor, Hamdard Convention Centre, Jamia Hamdard, New Delhi – 110 062. Scanned copy of the filled – in feedback form can also be sent to me at sodl@jamiahamdard.ac.in.

ACADEMIC SESSION: _____

S No	Feedback Questions	Answers & Remarks
1	Your Name	
2	Your Programme	
3	Your Enrollment Number	
4	Year of Study: Mention – I, II, III, IV, V, VI Semester / 1st, 2nd , 3rd Year	
5	Your Mobile Number:	
6	Your Email ID	
7	Are you in service / employed? Mention – Yes / No	
8	Have you received your Identity Card in time? Mention - Yes / No	
8	Have you received your study material? Mention - Yes / No	
10	Have you received your study material in time? Mention - Yes / No	
11	Have you gone through your study material thoroughly? Mention - Yes / No:	

12	How do you rate quality of the study material? Mention - Excellent / Good / Poor:	
13	Did you attend the Induction Meeting? Mention – yes / No	
14	Have you attended the counselling session? Mention - Yes / No:	
15	If yes, how many counselling sessions you have attended? Mention the number:	
16	Are the counselling sessions conducted as per the schedule? Mention - Yes / No	
17	How do you rate quality of the counselling sessions conducted? Mention - Excellent / Good / Poor:	
18	Have you attended the practical sessions? Mention - Yes / No, if applicable:	
19	How many practical sessions you have attended? Mention number, if applicable:	
20	Are the practical sessions conducted as per the schedule? Mention - Yes / No	
21	How do you rate quality of the practical sessions conducted? Mention - Excellent / Good / Poor	
22	How do you rate ambiance and physical upkeep of the class rooms / laboratories where your counselling / practical sessions were held? Mention - Excellent / Good / Poor	
23	Have you submitted Assignments / Projects? Mention - Yes / No	
24	Are you satisfied with the evaluation of your Assignments / Projects? Mention - Yes / No	
25	Are you receiving feedback from your academic counsellors on your assignment responses? Mention – Yes / No	
26	Have you availed Library Services of Jamia Hamdard? Mention - Yes / No	
27	If No, then why? (You may add additional sheet, if required)	

28	If Yes, how do you rate the quality of library services at Jamia Hamdard? Mention - Excellent / Good / Poor	
29	Have you appeared in the examinations conducted by SODL, Jamia Hamdard? Mention - Yes / No	
30	If Yes, mention the quality of conduct of the examinations. Mention - Excellent / Good / Poor	
31	Are you satisfied with evaluation of your examination papers? Mention - Yes / No	
32	If No, mention reason thereof! Attach additional sheet if required.	
33	Are you getting result in time? Mention - Yes / No	
34	Are you receiving your mark sheets in time? Mention - Yes / No	
35	Are your grievances redressed satisfactorily at SODL? Mention Yes / No	
36	Are your emails responded at SODL in a reasonable time? Mention - Yes / No	
37	How do you rate the quality of responses given to your emails / grievances at SODL? Mention - Excellent / Good / Poor	
38	Have you visited SODL for queries / redress of your grievances? Mention - Yes / No	
39	Are you satisfied with the responses given to you at SODL? Mention - Yes / No	
40	How do you rate the quality of responses given to you at SODL? Mention - Excellent / Good / Poor	
41	How frequently do you visit website of Jamia Hamdard www.jamiahamdard.edu to check for updated information about your studies? Mention – Regularly / Frequently / Never	
42	How do you rate the information given on the website about your studies at Jamia Hamdard? Mention - Excellent / Good / Poor	
43	How frequently do you receive emails alerts from SODL / Programme Coordinators about your studies at Jamia Hamdard? Mention – Regularly / Frequently / Never	
44	How do you rate behavior of teachers of Jamia Hamdard?	

	Mention – Excellent / Good / Poor	
45	How do you rate behavior of staff of Jamia Hamdard? Mention – Excellent / Good / Poor	
46	Are you satisfied studying at Jamia Hamdard? Mention – Yes / No	
47	Will you recommend your friends and relatives to get enrolled for ODL Programmes of Jamia Hamdard? Mention – Yes / No	
48	Would you like to continue your studies at Jamia Hamdard? Mention Yes / No	
49	In which Programme / Course you would like to get enrolled?	
50	Mention the market need – based Programmes / Courses Jamia Hamdard should offer through distance mode	1.
		2.
		3.
		4.
		5.

GENERAL REMARKS AND SUGGESTIONS FOR IMPROVEMENT: (Attach additional sheet, if required)

_____
_____
_____
_____
_____
_____

Date: _____

SIGNATURE OF THE LEARNER

FEEDBACK OF ACADEMIC COUNSELLORS FOR IMPROVING QUALITY OF THE ODL PROGRAMMES AND THE STUDENT SUPPORT SERVICES

We are obtaining feedback from you to improving the quality of ODL Programmes on offer and also to improve the quality of support services provided to the learners. May I requesting you to kindly provide the following information as your feedback on the academic programme you are associated with at the School

of Open and Distance learning, Jamia Hamdard. This feedback would help us for improving quality of the academic programmes and quality of the academic support services provided to learners of your programme.

The filled – in feedback form may please be submitted to the undersigned at the School of Open and Distance Learning, First Floor, Hamdard Convention Centre, Jamia Hamdard, New Delhi – 110 062. Scanned copy of the feedback form can also be sent to me at sodl@jamiahamdard.ac.in.

ACADEMIC SESSION: .....

S No	Feedback Questions	Answers
1	Your Name	
2	Your Programme	
	Courses approved for conducting the academic counselling	1.
		2.
		3.
		4.
		5.
3	Have you received a set of study material? Mention – Yes / No	
4	How many sessions you have conducted in the current academic session. Mention the number	
5	Have you conducted the counselling sessions as per the schedule notified on the website / Notice Board? Mention – Yes / No	
6	How do you rate quality of the study material? Mention – Excellent / Good / Poor	
7	Do you feel syllabus / study material of your Programme needs revision / updating? Mention – Yes / No	
8	Would you like to be a course writer for updating the study material? Mention – Yes / No	
9	Mention the courses / subjects of your choice for wring the study material.	1.
		2.
		3.
		4.
		5.
10	Are learners of your course attending the counselling sessions regularly? Mention – Yes / No	

11	How many learners attend your counselling sessions? Mention an average number.	
12	Do they come prepared for attending the counselling sessions? Mention – Yes / No	
13	Do the learners seek clarifications and participate in discussions during the counselling sessions? Mention – Yes / No	
14	How do you rate participation of the learners during the counselling sessions? Mention – Excellent / Good / Poor	
15	Do the learners approach you on non – counselling days for clarification of their doubts / queries? Mention - Yes / No	
16	Do you evaluate assignments / projects of the learners? Mention – Yes / No	
17	How do you rate quality of the assignments / projects submitted by the learners? Mention – Excellent / Good / Poor	
18	Do you evaluate examination answer books of the learners? Mention – Yes / No	
19	How do you rate quality of response of the learners in their examination papers? Mention – Excellent / Good / Poor	
20	Are you satisfied with the amount of remuneration being paid for conducting the counselling sessions? Mention - Yes / No	
21	Mention the expected amount of remuneration for conducting the counselling sessions	
22	Please suggest new market need – based programmes to offer through distance mode.	1.. 2 3. 4. 5.

23. GENERAL REMARKS AND SUGGESTIONS FOR IMPROVEMENT (Attach additional sheet if required)

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_____

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Date: _____

SIGNATURE OF THE ACADEMIC COUNSELLOR