KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

(KKHSOU)

PROGRAMME PROJECT REPORT

ON

BACHELOR OF COMPUTER APPLICATION (BCA)

Submitted to

UNIVERSITY GRANTS COMMISSION

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NEW DELHI – 110 002

Submitted by

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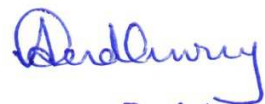# CONTENTS

KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY (KKHSOU)

PROGRAMME PROJECT REPORT

BACHELOR OF COMPUTER APPLICATION PROGRAMME

FOR THE ACADEMIC SESSION 2018-19

1.1 Programme's mission & objectives

Bachelor of Computer Application (BCA) is a three-year degree programme under semester system in which learners will be exposed to various areas of computer applications including the latest developments in IT. The aim of the programme is to open a channel for admission to IT courses for the learners who have done 10+2 and are interested in taking IT as a career. This programme comprises 21 courses including practical and project work. There are six semesters in this course, and in each semester, there are four papers. The sixth semester involves only project work.

The followings are the main objectives of the programme:

- To produce skilled IT human resources in Assam.
- To help the learners and teachers to update their knowledge and skills, especially for those located in rural/backward/remote areas.
- To reach the unreached.

1.2 Relevance of the programme with KKHSOU's Mission and Goals

Computer Science is considered one of the best career options, not only in India, but also outside the country. There are bright career prospects for computer science professionals or software professionals in the context of the recent scenario. With the opening of huge software and IT companies in India, the job opportunities for trained professionals have increased considerably. India is known to be a leader in software and IT sector. Computer science graduates find job opportunities in a variety of environments in academia, research, industry, government, private, business organizations, and so on. They are involved in analyzing problems for solutions, formulating and testing, using advanced communications or multi-media equipment, or working in teams for software product development. The software and IT

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companies are the major employers of computer science graduates. They offer the best packages to the young graduates which are unmatched with other branches of science.

Some of the popular career options for the computer science graduates are listed below:

1. Telecom sector: A large number of telecom company including BSNL, Airtel, Aircel, Vodafone, Reliance etc. are recruiting graduates of computer professional.

2. Graphic designing

Graphic designers have an exciting job at hand, as they get to work on interesting projects. Front-end web designing is one of the career options which computer graduates can make themselves eligible for. Front end designers spend their time creating the "look and feel" of websites. Those who are not satisfied with merely handling the front-end aesthetics push themselves and gain complete expertise in other web technologies like PHP and Ruby.

3. Software Testing

A software testing takes the important responsibility of improving the quality of the application. A tester or quality analyst essentially should have knowledge of the entire software development lifecycle as software testing is done in each phase of product life cycle, from requirement specifications, coding, to design.

4. Mobile Application Developer

Smart phones have become as common place as anything can be, and with their rising use, there is a growing market of mobile apps. The strength of smart phones is through the diverse range of mobile apps that make every task a matter of seconds. Every business, in its plan to diversify and expand is now offering its services through mobile apps. These apps are developed by mobile app developers. For professionals with a degree in computer science and programming skills, mobile app development offers a fresh opportunity to embark on a career makeover. As market demand, surges for apps running on iOS, Android or any operating system that will power the next generation smart devices, IT professionals with skills in Java, C, C++ and native app

development are much sought after in the job market. The BCA programme will help in producing skilled IT human resources which will be in confirmity of KKHSOU's mission and goals.

1.3 Nature of prospective target group of learners:

The North Eastern region of the country can be thought of as a miniature India. People living in this region with different linguist groups and different culture are lagging behind in higher education. Moreover, the economic condition of Assam and the other states of the region is very poor as compared to other part of the country. A large section of the young generation including girls, women and differently able are working at different govt. and non-govt. organizations after their 10+2 level education in different remote places. These young and dynamic people of Assam are working in different sectors like telecom, finance company, shopping mall, drugs distributing company, education sector (primary teaching and non-teaching), construction company, IT etc. They are deprived of higher education due to economic conditions, geographically remote area etc. The BCA Programme will help this section of people of Assam for getting their higher education.

1.4 Appropriateness of the Programme to be Conducted in ODL Mode to Acquire Specific Skills and Competence:

Like other higher educational institutes such as IGNOU, NIELIT (Previously DOEACC), CISCO certification, it is possible to offer BCA programme in the Open and Distance learning mode. It is observed that the candidates after completing BCA or 'A' level from IGNOU or NIELIT are getting good jobs in either the Government sector or private sector.

1.5 Instructional design: The syllabus is designed with the help of the departmental faculty members along with some external experts from the same discipline. At the time of designing the BCA syllabus, the following members were actively involved.

Sl no	Name	Designation	Organization
1	Prof. Anjana Kakoti	Professor & Head, Dept. of Computer Science, Dean Faculty	Gauhati University

		of Technology, Gauhati University	
2	Prof. Pranhari Talukdar	Professor & Head, Dept. of Instrumentation [presently retired]	Gauhati University
3.	Prof Hemanta Barua	Professor & Head, Dept. of Statistics[presently Vice Chancellor, Bodoland University	Gauhati University
4	Dr. Tapashi Kashyap Das	Asst. Professor	KKHSOU
5	Sruti Sruba Bharali	Asst. Professor	KKHSOU

The syllabus is designed in such a way that any prerequisite computer knowledge learners can take admission in this course. The detail course wise syllabus is enclosed in **Annexure I**.

1.5.1 Duration of the course: 3 years (Six semesters)

1.5.2 Faculty and support staff: The Department of Computer Science, KKHSOU has the following teaching staff.

Sl no	Name	Designation	Qualification
1	Dr. Sanjib Kr. Kalita	Associate Professor	MCA, Ph. D
2	Dr. Tapashi Kashyap Das	Asst. professor	MSc. Ph. D
3.	Sruti Subhra Bharali	Asst. Professor	M. Tech, UGC NET

1.5.3 Instructional delivery mechanism: All the study centres of KKHSOU, including the city study centre, which is in-house study centre of KKHSOU, are providing counseling sessions on every Sunday of the week. The counseling methods are mainly lecture based method. In certain situation, the following techniques are used

a.   ppt presentation

b.   video demo with the help of online

c.   NPTEL lecture notes design and developed by most IITS

1.6 Procedure for Admission, Curriculum Transaction and Evaluation:

Admission is done purely through offline mode. However, from the next academic year (2018-19), it is proposed to shift the admission process from offline to online. A learner may take admission in the BCA programme at any study centre spread throughout the state of Assam provided that the study centre offers the programme as desired by the learner.

For admission to BCA programme, course fee is to be paid through the Bank Challan attached with the Prospectus or through SBI e-collect at any branch of State Bank of India. Application along with necessary enclosures and a copy of the Challan returned by the Bank after payment, is required to be submitted at the recognized Study Centre within due date. Relevant documents are required to be submitted along with the admission form.

Those learners who are unable to complete the programme within the specified maximum period will be required to register themselves afresh by paying the requisite fee as per the University regulations.

1.6.1 Continuous Admission: After completion of a particular semester, a learner is required to apply for next semester simply by paying the necessary fees within one month of the last examination day of the previous semester. Admission in subsequent semester does not depend on the results of the earlier semester. One may take admission in the next semester even without appearing in previous semester examination. Admission should be taken continuously in BCA programmes without any break. A learner will be allowed to appear in all the examinations including back papers within the stipulated time of a programme.

1.6.2 Curriculum Transaction

The following supports are provided to the learners of BCA programmes other than SLM:

a. Counseling sessions at the respective study centre.

b. ICT support: KKHSOU facilitates its BCA learners with the following ICT based Services:

    i.   University Website

    ii.   Community Radio Services

    iii.   Ekalavya (A special programme launched by KKHSOU with the help of Prasar Bharati of Government of India)

    iv.   Akashvani Phone in Programme

    v.   e-BIDYA (An e-learning Portal)

    vi.   KKHSOU Mobile Application

    vii. SMS Alert facilities

    viii. Assignments (Continuous assessments)

c. The University conducts semester examinations twice in a year.

d. The home assignments are a part of the teaching learning process and are compulsory. The home assignments marks are filled out of 20 for theory papers.

1.6.3 Eligibility criteria for the BCA Programme

Academic Programme	Eligibility Criteria
Bachelor of Computer Application (BCA)	a. 10+2 or equivalent examination passed with Mathematics or Computer Science from a council/University recognised by UGC. b. Diploma passed from polytechnics in any branch of engineering. c. Candidates not having Mathematics or Computer Science at 10+2 level shall have to take 3 additional papers namely, Additional Mathematics-1, Basic Science-1 and Computer Science and Application-1

1.6.4 Evaluation: The academic quality and performance of the learners are evaluated through home assignment and end semester examination. The weightage of the assignment is based on the paper whether it is theory based or practical based. If the paper is theory based, then 20% weightage is given to the assignment. If the paper is practical based, then 10% weightage is assigned to the assignment.

1.6.5 Fees structure: There are six semesters in the BCA programme. The learners need to pay fees every semester. The structure of fee is given below

Progr amme	Se m	Enrolm ent Fee(Rs.)	Cours e Fee(R s.)	Exa m Fee (Rs.)	Practica l Fee(Rs.)	Exam Centr e Fee (Rs.)	Mark - sheet Fee (Rs.)	Desse r- tation Fee (Rs.)	Total Fees to be paid (Rs.)	Arrear Subjects
BCA	1	300	3,500	450	300	200	50	….	4,800	Rs.200 per paper + Practical Fee(if applicable) +Centre Fee + Mark sheet FeeRs.50+ Consolidate d Mark sheet Rs.100
	2	….	3,500	600	150	200	50	….	4,500	
	3	….	3,500	450	300	200	50	….	4,500	
	4	….	3,500	600	150	200	50	….	4,500	
	5	….	3,500	450	….	200	50	….	4,200	
	6	….	3,500	300	150	200	150	1,000	5,300	

1.7 Requirement of Laboratory Support and Library Resources

1.7.1 Laboratory support: The study centres offering BCA programme must have a well-equipped computer laboratory. There should be at least 10 (ten) computers along with sufficient UPS backup facility and high-speed internet connection. Depending upon the enrolment, the number of computers may be more then 10. The student computer ratio should be 2:1. The number of practical learning hours is mentioned in the SLM itself. The SLM is designed in such a way that learners do not require having any practical

guidebook. The SLM itself is having instructions to proceed with laboratory work. At present, KKHSOU is having a computer laboratory with the following configuration.

Sl no	Item	Quantity
1	**Desktop** Make HP/Model; **Specification :**Intel core2duo, 2GB DDR RAM 320 GB HDD SATA 18.5" TFT Monitor/Windows 7 Professional & Key Board & Mouse	15
2	600 VA UPS	15
3	High speed Internet connection	
4	Connected with LAN	

Library support: There is a well-equipped library with reading room facility at the permanent campus of KKHSOU. The total number of books available in the library is 634 (registered as on 30/08/2017). Apart from the books, JSTOR database can be used by the learner to access e-journals.

1.6.7: Proposed Laboratory support: The department of Computer Science, KKHSOU is proposing a new well-equipped computer laboratory at the city study centre with the following configuration.

Sl No.	Item	Qty required
1	**Tower Server** Make: HP/Model; HP ProLiant ML350 Gen9-SFF Perform **Specification:** 1 x Intel® Xeon® E5-2620v4 (2.1GHz/8- core/20MB/85W) Processor/24 DiMM Slots/HP 16GB (1x16GB) Dual Rank x4 DDR4-2133 CAS-15-15-15Registered Memory Kit/8 SFF (2.5inch) Hot Plug / 2XHP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) SC /HPSmart Array P440ar 2G controller/DVD RW/2 x800W FS Plat Ht Plg Pwr /HPE Embedded Ethernet1Gb 4--port 331i Adapter/HP iLO (Firmware:	1

	HP iLO4) with 2GB NAND **OS:** Microsoft Windows Server 2012 R2 Standard Edition ROK /18.5" TFT Monitor/Key Board &Mouse/**3 Yrs. 24x7 4Hr On site Warranty**	
2	**HP Workstation** **Specification :** Intel Xeon E5-2697 v2 2.70Ghz 30MB 1866 12C 1st 16GB DDR3-1866 (4x4GB) 1CPU Registered RAM16X Super Multi DVDRW SATA 1st ODD/ Windows 10 Pro 64 bit	1
3	Desktop Make HP/Model; HP 280G2**Specification :**Intel core i7-6700U 6th Generation/8GB DDR4 RAM 1 TB HDD SATA HDD/Optical Disk drive: No ODD On Board Graphics/ 18.5" TFT Monitor/Windows 10 Professional & Key Board & Mouse /**3 years OEM warranty**	20
4	Laptop Make HP/Model: HP Pro book 440 G4 **Specification :** Intel core i7-7500U 7th Generation8GB DDR4 / 1 TB SATA HDD/ No ODD/14" LED Full HD/Backpack Operating System: Windows 10 Professional **3 years OEM warranty**	5
5	**Color LaserJet(Print, Copy, Scan, and Fax)** **Make: HP/Model; LaserJet Pro MFP M277dw** **Specification:** • Prints up to 18 ppm1 A4 (Blk/Clr) • 800 MHz processor with 256MB RAM • Duty Cycle up to 30,000 pages • RMPV: 250 to 2,500 pages2 • Black (best): Up to 600 dpi; Color (best): Up to 600 dpi	1
6	**HP Scan Jet Enterprise 7500(Legal flatbed)** 1 **Flatbed Scanner Series** **Specification:** • Up to 50 ppm/100 ipm • Up to 3,000 pages per day; Hi-Speed USB 2.0 • Up to 600 dpi scanning resolution	1
7	10 KVA On Line UPS(3Phase-1 Phase) Make : Numeric Backup: 60 Minutes Backup Battery: 24 NosX100 AH SMF Battery With Accessories/ 1year On UPS & Battery Warranty	1
8	a)Air Conditioner(2.0 Ton) Make: IFB	2
	b)Stabilizer	2
	c) Starter	2
	d) Fitting charge	
9	Cat6 Cable (610 Mtrs -2 Box) Make: Digilink	2 box
10	Patch Panel 24 Port Loaded Make: Digilink	3 box

11	I/o With SMB Make: Digilink	20 nos
12	2 Mtr Patch Cord Make: Digilink	20
13	1 Mtr Patch Cord Make: Digilink	20
14	9 U Rack with Accessories Make: Val Rack	1
15	24 Port Gigabit Unmanaged Switch Make: Digisol Model:DG-GS-1024 D	2
16	8 Port Gigabit Unmanaged Switch Make: Digisol Model:DG-1008	1
17	RJ 45	40
18	Cat 6 Cable laying with conduit	20
19	Net working Intimation Charge	100
20	Furniture	20 set
21	LCD projector	1

1.8 Cost estimate of the Programme and Provisions:

All financial records regarding the printing of SLMs, honorarium paid to the members of the Expert Committee, honorarium paid to Content Writers, Content Editors, Language Editors, Translators, Proof Readers, and also the expenditure related with organizing counsellors' workshops, meeting of the co-ordinators of the study centres etc. are maintained by the office of the Finance Officer of KKHSOU. Moreover, the finance office also maintains records of purchase of computers, online space, books, journals etc. The accounts are maintained as per the laid down procedures of government.Regarding the cost of programme development, programme delivery, and programme maintenance, the finance office conducted an exercise based on historical costing method to arrive at indicative figures of cost. The findings are presented below in respect of the BCA Programme.

1.8.1 Programme Development Cost: Rs. 13,37,550.00

The office of the Finance Officer of KKHSOU has worked out the following also.

   a) SLM Development Cost for Under Graduate programme English medium per Unit Rs. 5,500/-.

  b) Printing Cost per SLM Rs. 56/-.

  c) Cost of CD per unit Rs. 23/-.

1.8.2 Programme Delivery Cost:

The SLMs prepared are delivered to various study centres located at the far-flung remote areas. On an average, the University delivers about 15 kgs of study materials per student. The cost of delivery of 1 kg of such material is Rs.10. Accordingly, depending upon the number of candidates; the cost for the BCA Programme will be provisioned by the University. The office of the Finance Officer has calculated the delivery cost of SLM per student at Rs. 150.00

1.8.3 Programme Maintenance Cost:

The University will keep financial provision for organizing stake holders' meetings, counselling workshops etc. as per the Academic Plan and Academic Calendar approved by the Academic Council of the University. The workshops conducted by the University will not only benefit the learners of the BCA programme, but will also benefit the learners of other programmes. The University will also bear the cost of organizing the meeting of Syllabus Revision Committee etc. and also for supply of additional study materials if required for improving the quality of the programme. Moreover, the University will keep on investing in developing the IT infrastructure so that the learners can benefit from the ICT enabled programme.

The maintenance cost calculated by the office of Finance Officer for the maintenance of the Under Graduate Arts programmes per student is Rs.600.00.

The figures as indicated above will be applicable to the BCA Programme of the University. The University will keep adequate financial provision for development, delivery, and maintenance of the programme presented as per the Programme Project Report. However, the department has also carried out an exercise to calculate the cost associated with offering the BCA Programme. The findings are stated below.

There are four main heads for the expenditure to run the BCA programme. They are

a. Curriculum and SLM development [non recurring]

b. Laboratory setup [non recurring]

c. Teaching staff [Recurring]

d. Annual maintenance [Recurring]

a. SLM development: The SLM development process includes syllabus design, manuscript writing, contenting editing, language editing, formatting, printing and binding. The cost for developing the SLM for a particular course is as follows

i. Manuscript writing (per unit) : Rs. 3000/-(for 12 units Rs. 36000/-)

ii. Content editing : Rs. 10,000/-(per course)

iii. Language editing : Rs. 10,000/-(per course)

iv. Printing & binding : Rs. 64,000/-(per course for 500 copies)

Total : Rs. 1,20,000/-

	Course1 (12 unit)	Course2 (12 unit)	Course3 (12 unit)	Course 4(12 unit)
Sem I (Dev. & Printing cost)	120000/-	120000/-	120000/-	120000/-
Sem II (Dev. & Printing cost)	120000/-	120000/-	120000/-	120000/-
Sem III (Dev. & Printing cost)	120000/-	120000/-	120000/-	120000/-
Sem IV (Dev. & Printing cost)	120000/-	120000/-	120000/-	120000/-
Sem V (Dev. & Printing cost)	120000/-	120000/-	120000/-	120000/-
Sem VI (Dev. & Printing cost)	120000/-	120000/-	120000/-	120000/-

Total cost for SLM for three years: Rs. 24,00,000

b.   **Laboratory setup cost**: The computer laboratory is having 20 computers.

Sl No.	Item	Unit Price	Qty required	Total Price
3	Desktop Make HP/Model; **Specification :**Intel core i3 /4GB DDR4 RAM 1 TB HDD SATA HDD/Optical Disk drive: No ODD On Board Graphics/ 18.5" TFT Monitor/Windows 10 Professional & Key Board & Mouse /**3 years OEM warranty**	32500.00	20	65000.00
5	**Color LaserJet(Print, Copy, Scan, and Fax) Make: HP/Model; LaserJet Pro MFP M277dw** **Specification:** • Prints up to 18 ppm1 A4 (Blk/Clr) • 800 MHz processor with 256MB RAM • Duty Cycle up to 30,000 pages • RMPV: 250 to 2,500 pages2 • Black (best): Up to 600 dpi; Color (best): Up to 600 dpi	67000.00	1	67000.00
6	**HP Scan Jet Enterprise 7500(Legal flatbed) 1 Flatbed Scanner Series Specification:** • Up to 50 ppm/100 ipm • Up to 3,000 pages per day; Hi-Speed USB 2.0 • Up to 600 dpi scanning resolution	90000	1	90000.00
7	20 KVA On Line UPS(3Phase-1 Phase) Make : Numeric Backup: 60 Minutes Backup Battery: 24 NosX100 AH SMF Battery With Accessories/ 1year On UPS & Battery Warranty	471845.00	1	471845.00
8	a)Air Conditioner(2.0 Ton) Make: IFB	47000.00	2	94000.00
	b)Stabilizer	5000.00	2	10000.00
	c) Starter	1000.00	2	2000.00
	d) Fitting charge			2000.00
9	Cat6 Cable (610 Mtrs -2 Box) Make: Digilink		1 box	6780.00
10	Patch Panel 24 Port Loaded Make: Digilink		2 box	8720
11	I/o With SMB		20 nos	8250.00

	Make: Digilink			
12	2 Mtr Patch Cord Make: Digilink	150.00	20	3000.00
13	1 Mtr Patch Cord Make: Digilink	140.00	30	5200.00
14	9 U Rack with Accessories Make: Val Rack	6900.00	1	6900.00
15	24 Port Gigabit Unmanaged Switch Make: Digisol Model:DG-GS-1024 D	7000.00	1	7000.00
16	8 Port Gigabit Unmanaged Switch Make: Digisol Model:DG-1008	2120.00	1	2120.00
17	RJ 45	15.00	60	900.00
18	Cat 6 Cable laying with conduit	610.00 mtr	30	18300.00
19	Net working Intimation Charge	50.00	100	5000.00
20	Furniture	3000.00	30 set	90000.00
21	LCD projector	240000.00	1	240000.00
22	Renovation			500000.00
			Total	1704015.00

C. Teaching staff: It is assumed that in each course there will be 20 counseling sessions held during a semester. The honorarium for the teachers per class is Rs. 1000/-. Therefore, the tentative total expenditure for the entire programme will be:

	Course1(12 unit)	Course2(12 unit)	Course3(12 unit)	Course 4(12 unit)
Sem I	20000/-	20000/-	20000/-	20000/-
Sem II	20000/-	20000/-	20000/-	20000/-
Sem III	20000/-	20000/-	20000/-	20000/-
Sem IV	20000/-	20000/-	20000/-	20000/-
Sem V	20000/-	20000/-	20000/-	20000/-
Sem VI	20000/-	20000/-	20000/-	20000/-

Total Rs. 320000 (Rupees three lakhs twenty thousand only)

d. Maintenance cost: The annual maintenance cost for the computer laboratory will be approximately Rs. 2,00,000/- (Rupees two lakhs only) per year. So for a period of three years it will be Rs. 6,00,000/- (Rupees six lakhs only).

The approximate cost estimate for programme development, delivery and maintenance will be

Sl no	Head of expenditure	Expenditure(Rs.)
a	Curriculum and SLM development [non recurring]	24,00,000.00
b	Laboratory setup [non recurring]	17,04,015.00
c	Teaching staff [Recurring]	3,20,000.00
d	Annual maintenance[Recurring]	6,00,000.00
Total		**50,24,015.00**

Note: The figures as stated above are representative and reflective in nature based on certain assumptions and historical method of costing.

1.9 Quality Assurance Mechanism and Expected Programme Outcomes:

1.9.1 Quality Assurance Mechanism: The University follows a mechanism to review the syllabus and SLM at regular interval with the help of some external experts. On the basis of expert recommendations, the syllabus and SLM are modified and reprinted. It is also proposed to setup the a feedback system on SLM from the learners to improve the quality of SLM. Moreover, it has also been planned by the CIQA office to conduct stakeholders' meetings, SLM audit etc.

1.9.2 Learning Outcomes: After completion of BCA Programme, a learner will be able to do the following:

a. Independently handle a computer laboratory

b. Develop dynamic web application

c. Develop smart phone based apps

d. Computer network installation and configuration

e. PC maintenance and troubleshooting

f. Performing IT enabled services

g. Handling computer classes at school level

h. Developing and handling animated software for children and school

i. Performing as Graphics designer

j. Animation designing

Annexure I

BCA Syllabus Structure: (Total Credits: 96)

Semester	Course Code	Course Name	Total Credits
Semester-I	BCA(S1)01	Computer Fundamentals	4
	BCA(S1)02	PC Software	4
	BCA(S1)03	Digital Techniques	4
	BCA(S1)04	Computer Programming Using C	4
Semester-II	BCA(S2)05	Discrete Mathematics	4
	BCA(S2)06	Computer Based Accounting and Financial Management	4
	BCA(S2)07	Data Structure Through C Language	4
	BCA(S2)08	English for Professional Studies	4
Semester-III	BCA(S3)09	Object Oriented Programming Through C++	4
	BCA(S3)10	Database Management Systems	4
	BCA(S3)11	Operating System	4
	BCA(S5)12	Data Communication and Computer Networks	4
Semester-IV	BCA(S4)13	Computer Organization	4
	BCA(S4)14	Programming in Java	4
	BCA(S4)15	Environmental Studies	4
	BCA(S4)16	Software Engineering	4
Semester-V	BCA(S3)17A	Geographical Information System (GIS)	4
	BCA(S3)17B	Fundamentals of Cloud Computing	
	BCA(S5)18	Web Technology	4
	BCA(S5)19	Computer Graphics	4
	BCA(S5)20A	Data Warehousing and Data Mining	4
	BCA(S5)20B	Linux System Administration	
Semester-VI	BCA(S6)21	Image Processing	4
	BCA(S6)22	Open Source Software	4
	BCA(S6)23	Project	8

1 credit = 30 Learning hours

4 credit=30*4=120 learning hours

Detailed Syllabus

BCA (S1)01: Computer Fundamentals (Total Marks: 50+10+40**)**

4 credits: 120 hours of learning

Unit - 1: Introduction to Computer [5 hours, 5 marks]

Generation of computer, Application of computers, Advantages of computer, Structural evolution of computers, File structure of computers, Flynm's classification of computer architecture- SISO, MIND, SISD, SIMD

Unit - 2: Basic Features of Computer Classification [5 hours, 10 marks]

Classification based on operating principles (Analog computers, Digital computers, Hybrid computers), based on applications (General purpose computers, Special purpose computers) and based on size and capability (Microcomputers, Mini computers, Mainframe computers, super computers)

Unit - 3: Basic Components of Computer [5 hours, 5 marks]

Main components of a Computer System-Central Processing Unit (CPU), Input Unit (Mouse, Joystick, VDO, Keyboard), Output Unit (Printer, Plotter, Dot Matrix, Laser Printer), Memory, Control Unit and Buses

Unit-4: Computer Memory and Storage [5 hours, 5 marks]

Concept of Bit and Bytes, Computer Memory, Types of Memory: Memory Hierarchy- Register, Primary, Secondary Memory, Random Access Memory, Read Only Memory, Cache Memory, Virtual Memory

Unit -5: Number System [10 hours, 10 marks]

Representation of numbers (only a brief introduction to be given) and characters in computer, Binary, Hexadecimal, Octal, BCD, ASCII, EDCDIC and Gray codes, Conversion of bases. Representation of signed integers, Sign and magnitude, 1s complement and 2s complement representation, Arithmetic operations using 2s complement representation and conditions for overflow/underflow and its detection

Unit -6: Buses [5 hours, 8 marks]

Bus Structure- Address, Data and Control Bus, Different types of Buses–ISA, PCI, EISA, VESA, MCA, PCA

Unit 7: Introduction to System Software [5 hours, 10 marks]

Compiler, Assembler, Linker, Loader and Editor

Unit 8: Instruction Types [10 hours, 10 marks]

Different Types of Instruction format (8 bit, 16 bit), Bit manipulation, Control, Data Transfer Instruction

Unit 9: Basics of Operating Systems [10 hours, 6 marks]

Functions of OS, Types of OS, DOS, LINUX (Single User, Multiuser), UNIX, ZENIX, WINDOWS, Multiprocessing OS, Time sharing OS

Unit 10: Introduction to Programming [10 hours, 6 marks]

Algorithm, Flowchart, Pseudo code, Algorithm and Flowchart of Simple Program, Machine Language, Assembly Language, High-Level Language, Design of algorithm for simple program

Unit 11: File Structure [10 hours, 5 marks]

Data and Information, Records and its types, Files, Operations on Files

Unit 12: Computer Security [10 hours, 5 marks]

Computer Virus, Worm, SpyWare, Malware, Trojan Horse, Antivirus Software

Unit 13: Network Basic [10 hours, 5 marks]

SMPS. BIOS. Network Interface Card, network cabling, I/O Box, Switches, RJ 45 connectors, Patch panel, Patch cord, racks, IP address

Unit 14: Cyber Crimes & Legal Framework [10 hours, 5 marks]

Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act, 2000

Unit 15: Hardware Configuration [10 hours, 5 marks]

Different hardware configuration(Laptop/desktop), Typical RAM/ Hard disk size, Mother board series, different OEM(original equipment manufacturer), Processor series, FCC & UL for quality measure.

BCA (S1)02: PC Software (Total Marks: 50+10+40**)**

4 credits: 120 hours of learning

Unit- 1: Disk Operating System [5 hours, 5 marks]

Introduction to DOS, System files of DOS, concept of Booting, Files and Directory Structure, Concept of Paths, Internal and External commands, Batch File

Unit-2: UNIX Operating System [5 hours, 5 marks]

Introduction to UNIX, Login into UNIX, Characteristics, Features

Unit-3: LINUX Operating System [5 hours, 5 marks]

Introduction to LINUX, login into LINUX, Structure of File System, Concepts of Path

Unit-4: LINUX Commands [10 hours, 8 marks]

Directory handling Commands (**mkdir, cd, rmdir, ls, pwd**), File handling commands (**cat, cp, rm, mv, more, lp**), Utility commands (**date, cal, echo, time, who, password**), file permissions, vi text editor**,** three modes of vi editor, adding and replacing text, saving text and quitting

Unit-5: MS Windows Operating System [5 hours, 5 marks]

Introduction to Windows, Components of Windows, Customizing the Desktop, Files and Folders

Unit-6: Introduction to Word Processor [10 hours, 5 marks]

Starting WORD, Entering and Saving Text in a Document, opening the Word document and Closing MS-Word, Opening of an existing Document, Copy and Cut (Move), working with a document, Finding a particular pattern, Inserting objects into a document

Unit-7: Formatting a Word Document [10 hours, 8 marks]

The tab key, bullet and numbering, undo and redo, working with fonts, page break, header and footer, page setup, print setup, defining different margin, line spacing, inserting page number, inserting object or picture, news paper style column, Inserting different formula e.g. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, $(x + a)^n = \sum_{k=0}^{n} \binom{n}{k} x^k a^{n-k}$, $e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots, -\infty < x < \infty$

Unit -8: Working with Tables [10 hours, 8 marks]

Creating a table, deleting a table, moving around a table; selecting a table, column, row and cell; entering, editing and deleting texts; inserting and deleting columns and rows; merging and splitting cells

Unit-9: Introduction to Spreadsheet Package [10 hours, 5 marks]

Starting of Microsoft Excel, Part of MS-Excel Window, Exiting MS-Excel

Unit-10: Working with Spreadsheet [10 hours, 8 marks]

Creating a New Workbook, Working with Cells: Entering Data, Editing Data, Highlighting Data, Bold, Underline and Italicize Data, Changing Font and Font Size, Merging of Cells; Choosing Menu Commands Using the Alt key; Inserting a Row and Column; Deleting a Row and Column; Saving a Workbook, Closing a Workbook

Unit-11: Working with Function and Charts [10 hours, 8 marks]

Operators in Excel, Working with Calculation and Functions, Entering a Function, Editing a Function, Working with Chart, Creating a Chart, Changing Size and Position of Chart, Modifying a Chart, formatting chart area, Labeling X and Y axis, putting legend, chart title,

Unit-12: Introduction to Presentation Software [5 hours, 5 marks]

Starting MS-PowerPoint, The Title Bar, The Menu Bar, The Toolbars, The Status Bar, Different Types of Views, Exiting MS-PowerPoint

Unit-13: Creating Slides [10 hours, 8 marks]

Creating a New Presentation, Working with Slides, Creating/Inserting New Slides, Changing Font and Font Styles, Deleting Existing Slides, Applying Design Templates, Applying Custom Animations, Applying Slide Transitions, saving a Presentation, Running a Presentation, Closing a Presentation, Opening an Existing Presentation

Unit 14: Formula in MS Excel [5 hours, 7 marks]

Logical: IF, Else, Not, AND, False, Text: char, find, len, lower, Text, trim, Upper, Value; Number: Sum, average, count, Max, Min etc

Unit 15: LATEX command [10 hours, 10 marks]

Creating document in Latex, different latex command, latex template, page setting in latex, report creation, writing formula in latex etc

BCA (S1)03: Digital Techniques (Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1: Introduction to Number Systems [5 hours, 8 marks]

Decimal, Binary, Hexadecimal and Octal number system, Number system conversion

Unit 2: Binary Arithmetic [10 hours, 8 marks]

Complement: r's and (r-1)'s complement, Binary addition, Binary subtraction, Binary Multiplication, Binary division.

Unit 3: Data Representation [5 hours, 8 marks]

Fixed Point representation and Floating point representation

Unit 4: Code Conversion [5 hours, 5 marks]

Gray code, BCD, BCD to Excess-3 code conversion technique, ASCII, EBCDIC

Unit 5: Boolean algebra [5 hours, 5 marks]

Introduction, Properties, De-Morgan's Theorem, Boolean Identities

Unit 6: Logic Gates [5 hours, 5 marks]

Logic Gates: AND, OR, NOT, NAND, NOR, XOR; Conversion of the logic gates

Unit 7: Floating point number representation [10 hours, 6 marks]

Floating point number, Normalization of floating point, overflow and underflow, detection of overflow, IEEE floating point standard

Unit 8: Logic Families [10 hours, 5 marks]

Introduction, Resistor Transistor Logic(RTL), Integrated Injection logic(IIL), Diode- Transistor Logic(DTL), Emitter-Coupled Logic(ECL), Transistor- Transistor Logic(TTL), TTL-NAND, Tri State Logic, MOS devices, Logic gates with MOSFET's

Unit 9: Reduction Techniques [10 hours, 10 marks]

Boolean Expression, SOP, POS, Conversion of SOP to POS and vice-versa, Simplification of Boolean expression by Algebraic method and Karnaugh Map, Don't care condition

Unit 10: Combinational circuit [10 hours, 10 marks]

Multiplexer, 4-to-1 multiplexer, Demultiplexer, Encoder, Priority encoder, Decoder,3-to-8 decoder,

Unit 11: Binary arithmetic circuits [10 hours, 5 marks]

Binary Half adder, Full adder, Binary Half subtractor, Full subtractor, 1's complement of n bit adder/subtractor

Unit 12: Sequential circuit [10 hours, 10 marks]

Synchronous and Asynchronous Sequential circuit, Flip-Flop and its different types: RS, JK; Master-Slave JK Flip-Flop

Unit 13: Registers [10 hours, 5 marks]

Shift register, SISO, PISO, SIPO, PIPO shift register, Application of Shift Register

Unit 14: Counters [10 hours, 5 marks]

Synchronous and Asynchronous Counter, Limitations of asynchronous counter, Frequency division counter

Unit 15: Memory organization [5 hours, 5 marks]

Memory types, Random access memory, Access time, RAM package, Static RSM, CMOS memory cell, Dynamic RAM, Read Only Memory, Memory expansion

BCA (S1)04: Computer Programming Using C (Total Marks: 50+10+40)

4 credits: 120 hours of learning

Unit 1: Introductory Concepts [6 hours, 5 marks]

Basic definition of Pseudo Code, algorithm, flowchart, program

Unit 2: Elements of C Programming [6 hours, 5 marks]

Characters used in C, Identifiers, Keywords, Tokens, Constants, Variables

Unit 3: Variables and Data types [6 hours, 5 marks]

Integer, character floating point and string; Initialization of variable during declarations; Symbolic Constants

Unit 4: Operators and Expressions [8 hours, 5 marks]

Expression in C, Different types of operators: Arithmetic, Relational and Logical, Assignment, Conditional, Increment and decrement, Bitwise, Comma and other operator (sizeof, period etc). Precedence and associatively of operators, type casting

Unit 5: Preprocessor Directives and I/O Functions [6 hours, 5 marks]

Header Files (stdio, conio), Formatted Input / Output Functions (scanf, printf), Escape Sequences, Character Input/Output Functions (getch, getchar, putchar, gets, puts, getche, clrscr)

Unit 6: Conditional Statements [8 hours, 5 marks]

Conditional Statement- if, if- else, nested if-else, switch-case; break, continue, goto

Unit 7: Loop Control Structures [8 hours, 10 marks]

Concept of Loops, Types of loop: while, do-while, for; nested loops

Unit 8: Storage Class [6 hours, 5 marks]

Automatic, External, Static, Register, Scope and lifetime of variables, Macro, Preprocessor directive

Unit 9: Arrays [10 hours, 10 marks]

Array, Array Declaration, 1-Dimensional array, 2-Dimensional array

Unit 10: Strings [10 hours, 10 marks]

String, String Handling Functions: strlen (), strcmp (), strcpy (), strrev (), strcat (), etc.

Unit 11: Functions [10 hours, 10 marks]

Function, Function declaration, Function definition, Function call, Formal and Actual parameter, Recursive function

Unit 12: Pointers [10 hours, 5 marks]

Pointer, Pointer declaration, Passing pointer to a function, Pointer and one-dimensional arrays,

Unit 13: Dynamic memory allocation [6 hours, 5 marks]

Introduction, Memory allocation functions: malloc (), calloc (), realloc (), free (), Memory allocation for array

Unit 14: Structures and Union [10 hours, 10 marks]

Structure Declarations, Definitions, Defining your typedef, Array of Structure, Pointer to Structure. Union Declaration, Definition, Declaration, Uses

Unit 15: File Handling [10 hours, 5 marks]

Concept of File, File Pointer, File Opening in various modes, closing a file, reading and writing on files, Formatted Input / Output, fseek (), ftell (), rewind ()

BCA (S2)05: Discrete Mathematics (Total Marks: 80+20)

4 credits: 120 hours of learning

Unit-1:   Sets   [6 hours, 8 marks]

Sets – the Empty Set, Finite and Infinite Set, Equal and Equivalent set, Subsets, Power set, Universal set, Venn diagram, Complement of a set, set operations

Unit-2:   Relations [8 hours, 6 marks]
Cartesian products, Relation - equivalence relation – partition

Unit 3: Lattices [8 hours, 6 marks]

Relation to partial ordering, lattices, Hasse Diagram

Unit-4:   Functions [8 hours, 6 marks]

Definition, Inverse functions - Composition of functions - Properties of functions - Binary operation

Unit-5:   Mathematical Logic [6 hours, 6 marks]

Statements, logical connectives, truth tables

Unit-6:   Application of Mathematical Logic [10 hours, 6 marks]

Tautologies, contradictions, logical equivalence, Applications to everyday reasoning

Unit-7:   Counting Principles [6 hours, 6 marks]

The Pigeonhole principle -counting

Unit-8:   Permutation and Combination [10 hours, 8 marks]

Definition of Permutation and combination, Simple application of permutation and combination

Unit-9:   Basic Algebraic Structure [10 hours, 6 marks]

Definition and basic properties of semi groups and groups

Unit -10: Ring [6 hours, 6 marks]

 Definition and basic properties of rings, examples

Unit -11: Integral Domains and Fields [6 hours, 6 marks]

Definition and basic properties of integral domains and fields

Unit-12: Matrices [10 hours, 10 marks]

Types of matrices - Matrix operations (addition, subtraction, multiplication, inverse)

Unit -13: Determinant and Inverse of a matrix [6 hours, 6 marks]

Inverse of a matrix, Rank and Nullity

Unit-14: Solution of system of linear equation   [10 hours, 6 marks]

Methods of solution to linear systems (Cramer's Rule, Gaussian Elimination Scheme)

Unit 15: Graphs theory [10 hours, 8 marks]

Introduction to graphs, Graph terminology, Representing Graphs, Connectivity, Directed, undirected graphs and their Matrix Representations

BCA (S2)06: Computer Based Accounting and Financial Management

(Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1: Introduction to Accounting [5 hours, 5 marks]

Definition, Nature and Importance of Accounting; Characteristics and Importance of Accounting Information; Users of Accounting Information; Branches of Accounting

Unit 2: Accounting Concepts and Principles [7 hours, 7 marks]

Meaning of Accounting Principles, Meaning and Importance of Accounting Standards; Generally Accepted Accounting Principles (GAAP); Accounting Standards and International Accounting Standards Committee; Brief Introduction of Accounting Standards issued by the Institute of Chartered Accountants of India; International Financial Reporting Standards

Unit 3: Double Entry System of Book- keeping [7 hours, 7 marks]

Meaning of Book- Keeping; System of Book- Keeping: Single Entry System; Double Entry System; Advantages and Disadvantages of Double Entry System; Meaning of Debit and Credit; Rules of Debit and Credit; Accounting Equation; Classification of Accounts

Unit 4: Preparation of Journal [7 hours, 6 marks]

Concept of Journal- Rough or General Journal and Special Journal; Advantages of Journal; Journalising of Transactions

Unit 5: Preparation of Ledger [8 hours, 7 marks]

Meaning of Ledger; Advantages of Ledger; Ledger Posting; Preparation of Ledger

Unit 6: Preparation of Cash Book [7 hours, 7 marks]

Concept and Importance of Cash Book; Preparation of Single Column, Double and Triple Column Cash Book.

Unit 7: Preparation of Petty Cash Book [7 hours, 5 marks]

Concept and Importance of Petty Cash Book; Preparation of Petty Cash Book

Unit 8: Partnership- I [8 hours, 7 marks]

Concept and Features of Partnership; Partnership Deed; Fixed and Fluctuating Capitals; Valuation of Goodwill; Admission of a Partner; Sacrificing Ratio; Practical Problems.

Unit 9: Partnership- II [8 hours, 7 marks]

Meaning of Retirement or Death of a Partner; Gaining Ratio; Amalgamation of Partnership Firms; Practical Problems

Unit 10: Accounting for Not- Profit Organizations and Professionals [10 hours, 7 marks]

Concept and Preparation of Receipts and Payments Account; Income and Expenditure Account; Balance Sheet; Items require Special Attention in Non- Trading Concerns: Subscriptions; Donations; Special Funds; Legacy; Entrance Fee; Fee for Life Membership; Accounting for Professionals.

Unit 11: Preparation of Trial Balance [10 hours, 8 marks]

Concept and Importance of Trial Balance; Preparation of Trial Balance

Unit 12: Preparation of Trading and Profit and Loss Accounts [10 hours, 8 marks]

Meaning; Components of Final Accounts; Importance of Trading and Profit and Loss accounts Preparation of Trading or Manufacturing Account and Profit and Loss Account; Practical problems.

Unit 13: Preparation of Balance Sheet [10 hours, 8 marks]

Concept; Importance; Marshalling of Balance Sheet; Preparation of Balance Sheet; Practical problems

Unit 14: Consignment Account [8 hours, 6 marks]

Meaning of Consignment; Sales and Consignment; Important Terms; Accounting for Consignment; Valuation of Unsold Stock; Accounting Treatment.

Unit 15: Joint Venture [8 hours, 5 marks]

Meaning of Joint Venture; Joint Venture and Partnership; Joint Venture and Consignment; Accounting Treatment

BCA (S2)07: Data Structure Through C Language (Total Marks: 50+10+40)

4 credits: 120 hours of learning

Unit 1: Introduction to Data Structure [5 hours, 5 marks]

Basic concept of data, Data type, Abstract Data Type, Types of Data Structure

Unit 2: Algorithms [5 hours, 5 marks]

Algorithm, Complexity, Time-Space Complexity, Algorithmic Notation (Big Ω, O, Θ)

Unit 3: Arrays [5 hours, 5 marks]

Arrays: Types, One dimensional array, Multidimensional arrays, memory representation, address translation functions, Applications of array, Random accessing of array element

Unit 4: Operations on Arrays [10 hours, 8 marks]

Traversal, Search, Problems associated with Insertion and Deletion, Sorting, Reversing, Merging

Unit 5: Recursion [5 hours, 5 marks]

Function, Rules for Recursive Function, Recursion versus Iteration, Advantages and Disadvantages

Unit 6: Linked List [6 hours, 8 marks]

Introduction to Linked List, Important terms associated with Linked list, Representation of Single linked list using Static and Dynamic Memory Allocation. Circular linked list, doubly linked list, Applications of Linked List

Unit 7: Operations on Linked List [10 hours, 8 marks]

Insertion of node in a linked list (at Start, at End, at a Given Position), deletion of node in a linked list (at Start, at End, at a Given Position), searching and traversal of elements and their comparative studies with implementations using array structure, Reversing a singly lined list.

Unit 8: Stacks [10 hours, 7 marks]

Definitions, LIFO, Representation using array and linked list structure, Applications of stack.

Unit 9: Queues [10 hours, 7 marks]

Definitions, FIFO, Representation using array, linked representation of queues, application of queue

Unit 10: Searching [10 hours, 7 marks]

Linear and binary search algorithms, performance and complexity using big 'O' notation

Unit 11: Sorting [10 hours, 8 marks]

Sorting algorithms (Complexity, advantages and disadvantage, implementation), bubble sort, insertion sort, selection sort, quick sort

Unit 12: Trees [6 hours, 5 marks]

Definition, Types of trees, implementation: Binary Tree, Tree traversal algorithms (in-order, preorder, post-order), infix, postfix, prefix notations

Unit 13: Binary Search Tree [10 hours, 7 marks]

Searching in Binary Search Tree, insertion and deletion in Binary Search Trees, Depth of Tree

Unit 14 B-Trees [10 hours, 7 marks]

Introduction, General n-ary trees, B Tree, Operations on B Trees: Searching keys, inserting key, Deleting a key

Unit 15: Graph [8 hours, 8 marks]

Introduction to Graphs, Edge, Vertex, Depth first search (DFS) and Breadth first search (BFS) technique

BCA (S2)08: English for Professional Studies (Total Marks: 80+20)

4 credits: 120 hours of learning

UNIT 1: Some Concepts of Grammar I [6 hours, 5 marks]

English Grammar an Introduction, Nouns—Kinds of Nouns, Forms of Nouns, Functions, The noun phrase, Agreement, Determiners—Articles, Demonstratives, Possessives, Quantifiers, Wh-determiner, Pre-determiners, Verb Forms

UNIT 2: Some Concepts of Grammar II [6 hours, 5 marks]

Adjectives, Adverbs, Prepositions

UNIT 3: Vocabulary [6 hours, 5 marks]

Synonyms and Antonyms, One word Expression, Words used as Different Word Classes, Phrasal Verbs, Distinction between Similar Words Often Confused

UNIT 4: Punctuation, Synthesis and Transformation of sentences [6 hours, 5 marks]

Role of Punctuation in Sentences, Punctuation Marks and their use, Synthesis of sentences, Transformation of Sentences

UNIT 5: Common Errors and Phrases & Idioms [6 hours, 5 marks]

Common Errors in English, Phrase and Idioms in English and Their Use

UNIT 6: Essay and Story Writing [10 hours, 10 marks]

Introduction to Essay Writing, Structure of Essay, Sample of Essays, Introduction to Story Writing, Techniques of Story Writing, Sample of Stories

UNIT 7: Précis Writing [9 hours, 7 marks]

Precis Writing, How to Write a Precis, Examples, Exercises

UNIT 8: Note making [9 hours, 7 marks]

Note making and note taking, Skimming and Scanning, format of note making, Samples

UNIT 9: Communication [8 hours, 7 marks]

Defining Communication, Significance and Process of Communication, Communication Network, Communication Media or Methods, Barriers To Communication, Effective Communication.

UNIT 10: Introduction to Office Management [8 hours, 6 marks]

Meaning of Office, Introduction to Office Management, Functions of Office, Relationship of Office with Other Departments, Office Accommodation, Layout and Environment, Office Furniture and Stationery, Office Correspondence and Filing System

UNIT 11: Correspondences I [10 hours, 8 marks]

Letter Writing, How to Write a Letter, Format of a Business Letter, How to Write a Memo, Examples

UNIT 12: Correspondences II [10 hours, 8 marks]

Notices, Types of Notices, How to Write a Notice, Press Release, How to Write a Press Release, Format of a Press Release

UNIT 13: Business Presentation I [10 hours, 8 marks]

Report Writing, Process of Writing a Report, Determining the Purpose of the Report, Determining the Factors, Gathering the Information Needed, Interpreting the Findings, Organizing the Report Information, Writing the Report, Project Report Writing, Criteria of a Good Project, Advantages of a Good Project, Disadvantages of Project Method, Format of a Project Report

UNIT 14: Business Presentation II [8 hours, 6 marks]

Writing Executive Summaries, Making Business Presentations

UNIT 15: Writing Curriculum Vitae/Resume [8 hours, 8 marks]

Difference between CV and Resume, Tips for writing CV/Resume, Essentials for writing CV/Resume, Facing Interviews based on CV/Resume, Telephonic Interviews based on CV/Resume

BCA (S3)09: Object Oriented Programming Through C++

(Total Marks: 50+10+40)

4 credits: 120 hours of learning

UNIT 1: Introduction to Object-Oriented Programming [5 hours, 5 marks]

Basic concept of OOP, Comparison of Procedural Programming and OOP, Benefits of OOP, C++ compilation, Difference between C and C++.

UNIT 2: Features of Object-Oriented Programming [5 hours, 5 marks]

 Abstraction, Encapsulation, Inheritance, Polymorphism

UNIT 3: Elements of C++ Language [5 hours, 5 marks]

Tokens and identifiers: Character set and symbols, Keywords, C++ identifiers. Variables and constants: Integers & Characters, Constants and Symbolic constants, Dynamic initialization of variables, Reference variables, Basic data types in C++.

UNIT 4: Operators and Manipulators [5 hours, 5 marks]

Operators, Types of Operators in C++, Precedence and Associativity, Manipulators

UNIT 5: Decision and Control Structures [10 hours, 10 marks]

If statement, If-else statement, switch statements, Loop: while, do-while, for; Jump statements: break, continue, Goto

UNIT 6: Array, Pointers and Structure [10 hours, 5 marks]

Arrays, pointer, structure, unions;

UNIT 7: Functions in C++ [10 hours, 10 marks]

The main() function, function prototype, function call, function definition, function parameter, <inline function>, default arguments, function overloading, <friend function>

Unit 8: Standard File System in C++ [5 hours, 5 marks]

Header Files, List of Header Files.

UNIT 9: Introduction to Classes and Objects [10 hours, 8 marks]

Classes in C++, class declaration, declaring objects, Defining Member functions, Inline member function, Array of objects, Objects as function argument, Static data member and member function, friend class

UNIT 10: Constructors and Destructors [10 hours, 10 marks]

Constructors, Instantiation of objects, Default constructor, Parameterized constructor, Copy constructor and its use, Destructors, Constraints on constructors and destructors, Dynamic initialization of objects, Constructor Overloading.

UNIT 11: Operator Overloading [10 hours, 10 marks]

Overloading unary operators: Operator keyword, arguments and return value; Overloading Unary and binary operators: arithmetic operators, manipulation of strings using operators, Type conversions.

UNIT 12: Inheritance [10 hours, 7 marks]

Derived class and base class: Defining a derived class, Accessing the base class member, Inheritance: multilevel, multiple, hierarchical, hybrid; Virtual base class, Abstract class.

UNIT 13: Virtual Functions and Polymorphism [10 hours, 5 marks]

Virtual functions, Pure virtual functions; Polymorphism, Categorization of polymorphism techniques: Compile time polymorphism, Run time polymorphism.

UNIT 14: Streams in C++ [5 hours, 5 marks]

C++ stream classes-put() and get() functions-getline() and write() functions- Overloading << and >> operators-Formatted Console I/O operations-ios class functions-width(), precision, fill(), setf() and unself()-Formatting flags.

UNIT 15: File Handling [10 hours, 5 marks]

File classes, Opening and Closing a file, File modes, Manipulation of file pointers, Functions for I/O operations, File handling functions()

BCA(S3)10: Database Management Systems(Total Marks: 50+10+40)

4 credits: 120 hours of learning

UNIT 1: File Structure [4 hours, 5 marks]

Data and Information, Concept of Field, Key field; Records and its types, Fixed length records and Variable length records; Files, Operation on files, Primary file organization

UNIT 2: Databases and DBMS [8 hours, 8 marks]

Introduction to Database, Traditional file approach versus Database approach; Characteristics of the Database approach: Self-describing nature of a Database System, Insulation between programs and data, data abstraction; Introduction to DBMS, Types of DBMS, Advantages of DBMS approach: Controlling Redundancy, Unauthorized access, Query processing, Backup and Recovery, Multiple user interfaces etc. ; Disadvantages of DBMS.

Unit 3: Database Users [4 hours, 5 marks]

Database administrator- Role of DBA, Database designers, End users, System Analyst and Application Programmers

UNIT 4: Database System [8 hours, 8 marks]

Database System, Database Architecture, The Three-Schema Architecture, Data Independence, Database languages and Interfaces, Database System Environment.

UNIT 5: Data Models [10 hours, 8 marks]

Conceptual model, Logical model, Physical model, Entity-Relationship (ER) model as a tool for conceptual design: Entities, Attributes and Relationships, Weak and Strong entities, Conversion of ER model into Relational schema, ER modelling symbols, Cardinality ratio.

UNIT 6: The Relational Model [10 hours, 8 marks]

Relational data model concepts, Integrity constraints: Entity integrity, Referential integrity, Different types of Constraints.

UNIT 7: Keys [6 hours, 7 marks]

Concept of keys, Composite key, Candidate key, Primary key, Alternate key, Foreign key, Defining Primary and Foreign keys in Database.

UNIT 8: Relational Database Design [8 hours, 8 marks]

Database Design, Decomposition, Universal Relation, Functional Dependencies, Prime and Non-prime attributes.

UNIT 9: Normalization [10 hours, 8 marks]

Normalization, First Normal form (1NF), Second Normal form (2NF), Third Normal form (3NF), Boyce-Codd Normal form (BCNF)

UNIT 10: Relational Algebra [10 hours, 6 marks]

Unary relational operations: SELECT, PROJECT, Sequences of Operations and the RENAME operation, Relational Algebra Operations from Set Theory: UNION, INTERSECTION, MINUS operations; Cartesian product operation; Binary Relational Operations; Binary Relational Operations: JOIN and DIVISION

UNIT 11: Introduction to SQL [6 hours, 5 marks]

Structured Query Language (SQL), Characteristics of SQL, Advantages of SQL, SQL Data types, Types of SQL commands, DDL, DML, Creating a Database, Creating, Altering, and Deleting Tables

UNIT 12: Entering Information through SQL [8 hours, 7 marks]

Inserting new data, Updating data (the WHERE Clause, The Logical AND and OR operator), Deleting Data.

UNIT 13: Extracting Information through SQL [10 hours, 8 marks]

The SELECT statement, Filtering results with the WHERE Clause; Logical Operators and Operator Precedence (Using logical operator NOT, BETWEEN, LIKE, IN); Ordering Results with ORDER BY(Joining columns-concatenation); Selecting data from more than one table, Join, Types of Join, SQL commands: Select… From…Where… Group by ….. Having… Order

by…, Tables, , Queries, Sub Queries, Insert, Update and Delete operations, Constraints considers (NOT NULL, UNIQUE, Check Primary key, Foreign key)

UNIT 14: Database Transaction and Recovery [4 hours, 5 marks]

Transaction concept, Transaction state, Implementation of Atomicity and Durability, Concept of database recovery, Backup of database, Types of database failure, Types of database recovery.

UNIT 15: Database Security [4 hours, 4 marks]

Goals of database security, Discretionary Access Control, Mandatory Access control, Statistical Databases, Data Encryption.

BCA (S3)11: Operating System (Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1:Introduction to Operating System [5 hours, 5 marks]

What is an operating system, Evolution of Operating Systems- batch system, multi-programmed system, time-sharing system, personal computer system, parallel systems

Unit 2:Processes [7 hours, 5 marks]

Concept of process, Process life cycle, Process Control Block (PCB), Process Management

Unit 3: Threads [7 hours, 5 marks]

Concept of Threads, Uses of Thread, Design Issues of Thread, Thread Management

Unit 4: Interprocess Communication [7 hours, 5 marks]

Interprocess Communication, Message passing model, shared memory model

Unit 5: Process synchronization and Co-ordination [7 hours, 8 marks]

Concept of race conditions, critical-sections, mutual exclusion, Solution to critical section problem, disabling interrupt, Peterson's solution, Sleep & Wake up, The Producer Consumer Problem

Unit 6:Semaphores [7 hours, 5 marks]

Semaphores, Wait and Signal, Binary Semaphores, Application of semaphores

Unit 7: Scheduling [10 hours, 8 marks]

Basic concepts, primitive and non-primitive scheduling, Types of scheduling - batch, interactive and real-time, Scheduling criteria, Scheduling algorithms, first come first serve (FCFS), shortest job first (SJF) and round robin (RR) scheduling

Unit 8:Deadlocks [10 hours, 10 marks]

What is deadlock, Conditions for deadlock, Deadlock detection, Resource allocation graph, Methods for handling deadlocks-ignore problem, recovery & prevention, deadlock avoidance (banker's algorithm), Congestion versus Deadlock

Unit 9:Memory Management[10 hours, 6 marks]

Concept of Multiprogramming, Swapping, Contiguous memory allocation, Fixed and Variable size partitioning, External and Internal Fragmentation

Unit 10: Segmentation and Paging [10 hours, 8 marks]

Basic Concept of Segmentation, Segmentation Architecture, Address Translation in Segmentation, Basic Concepts of Paging, Page Tables, Address Translation in Paging, Logical and Physical Address, Page replacement algorithms: - First in First Out, Optimal, NRU, LRU, Demand Paging

Unit 11: Virtual Memory [10 hours, 8 marks]

Introduction, Demand paging, pure demand paging, page replacement, need for page replacement, dirty bit, frame allocation algorithm, reference string,

Unit 12: File System [10 hours, 8 marks]

File Structure, File naming, File types(directory, regular, device), Sequential access and Random access files, File attributes, Operations on file, Directory Structure- Hierarchical directory structure, Path name (relative and absolute), Operation on directories, File System Implementation Techniques.

Unit 13: I/O Management [10 hours, 8 marks]

Basic principles of I/O Hardware, I/O Devices, Device controllers, DMA, Principles of I/O Software, Interrupt Handlers, Device Drivers, Device Independent I/O Software (its functions)

Unit 14: Protection [5 hours, 5 marks]

Needs for protection, domain of protection, Example in Unix, access matrix, Implementation of Access matrix.

Unit 15: Security [5 hours, 6 marks]

The security problem, Authentication, Password, password vulnerabilities, Ecnrypted password, One time password(OTP), Biometrics and its types, Program Threats : Torjan Horse, Trap door, System Threats: Worms, viruses Denial of services, Intrusion detection(definition only), cryptography

BCA(S3)12: Data Communication and Computer Networks

(Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1: Introduction to Data Communication [5 hours, 5 marks]

Introduction, Signals, Types of Signal: Analog, Digital, Block representation of Data Communication System, Definition of Protocols and Standards, Channel, Bandwidth, SNR

Unit 2: Types of Data Communication [5 hours, 5 marks]

Data Communication, Parallel and Serial Communication, Modes of Communication: Simplex, Half Duplex, Full Duplex; Asynchronous and Synchronous Communication

Unit 3: Digital Transmission Fundamentals [8 hours, 7 marks]

Digital Signal (PCM, Delta Modulation, Adaptive Delta Modulation, ASK, PSK, FSK), Multiplexing and De-multiplexing, Detection and Correction of Transmission Errors (Parity and Hamming Code Technique), Data Compression and Encryption, Concept of BCH Coding

Unit 4: Introduction to Computer Networks [8 hours, 8 marks]

Computer Network: Definition, Goals, Structure; Broadcast and Point-To-Point Networks; Types of Networks (LAN, MAN, WAN), Network Topologies, Network Protocols and Standards, Networking Switching Techniques

Unit 5: Network Models [6 hours, 7 marks]

Network Reference Models, OSI Reference Model, TCP/IP reference Model

Unit 6: Physical Layer [6 hours, 7 marks]

Physical Layer, Transmission Media, Guided and Unguided Media, Repeaters, Hub

Unit 7: Data Link Layer [8 hours, 7 marks]

Data Link Layer, Flow Control, Access Protocol, Bridges and Switches, MAC, LLC, Frame, Frame Format

Unit 8: Network Layer [8 hours, 7 marks]

Network Layer, Routing Protocols, Internet Protocol, IP Addresses, Sub-netting

Unit 9: Transport Layer [8 hours, 7 marks]

Process-To-Process delivery, User Datagram Protocol, Transmission Control Protocol: Characteristics, TCP Segment, Connection Establishment and termination

Unit 10: Session Layer [8 hours, 5 marks]

Interhost communication; Services- Dialog control, Token management, Synchronization;

Protocols- Remote Procedure Call (RPC), NETBIOS.

Unit 11: Presentation Layer [8 hours, 5 marks]

Services - Data conversion, Translation, Encryption, Compression; Protocols - FTP, Telnet.

Unit 12: Application Layer [8 hours, 7 marks]

Client-Server Model: Client-Server model, Socket interface; A brief introduction to DNS, SMTP, FTP

Unit 13: Fundamentals of TCP and UDP [10 hours, 8 marks]

Connectionless and Connection Oriented Protocol, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), IDP

Unit 14: Network Standard Protocol [8 hours, 5 marks]

FTP, Telnet, HTTP, Email Protocol, POP, SMTP, Browser, WWW, PING, Remote Login, Socket

Unit 15: Network Devices [8 hours, 5 marks]

Gateway, Bridge, Hub, Switch, RS-32C, Network Interface Card (NIC), Network Adapters, Components of NIC, Functions of NIC, Types of NIC; Ethernet: Basic Features, Types of Ethernet, Different Framer Format: IEEE 802.3, IEEE 802.4, IEEE 802.5

Unit 16: Wireless LANs [8 hours, 5 marks]

Wireless LANs (IEEE 802.11), Architecture, MAC Sub Layer, Frame Format, Frame Types, PSTN, Satellite Network

BCA (S4) 13 Computer Organization (Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1: Basic organization of the computer [6 hours, 6 marks]

Basic organization of the computer and block level description of the functional units from program execution point of view; Fetch, decode and execute cycle

Unit 2: Digital Components [7 hours, 8 marks]

Flip-Flops, Counter, Register, Half adder, Full Adder, Half subtractor, Full subtractor, Coder-Decoder, Multiplexer, De-multiplexer, Magnitude Comparator

Unit 3: Data Representation [7 hours, 7 marks]

Data representation, computer arithmetic and their implementation; control and data path, data path components, design of ALU and data path, control unit design

Unit 4: Computer Arithmetic [7 hours, 6 marks]

Integer representation, sign magnitude representation, twos complement representation, integer arithmetic

Unit 5: Floating point number representation [8 hours, 6 marks]

Floating point number, Normalization of floating point, overflow and underflow, detection of overflow, IEEE floating point standard

Unit 6: Instruction Sets [8 hours, 8 marks]

Elements of a machine instruction, instruction representation, Simple instruction format, Instruction types, number of addresses, Types of operands, Types of operations. Different Instruction Formats, Instruction Types, Instruction Execution, Assembly language notation

Unit 7: Addressing modes [8 hours, 7 marks]

Addressing, Immediate, Direct, Indirect, Registrar, Registrar indirect, Relative

Unit 8:Input-Output Organization [10 hours, 7 marks]

Different I/O techniques (Programmed I/O, Interrupt-Driven I/O), DMA (Direct Memory Access), I/O Processors

Unit 9: Introduction to Cache and Virtual Memory [10 hours, 7 marks]

Memory Hierarchy, Semiconductor memories, internal organization of typical RAM and ROM Memory, Switches, Cache memory, Cache memory access techniques; Mapping functions, Virtual memory, Locality of reference, Paging, Cache Coherence Problem

Unit 10: Memory and I/O access [10 hours, 7 marks]

Memory Read Write operations, Concept of handshaking, Polling Techniques (Serial and Half Polling) and Interrupt driven I/O, Priority and Daisy Chaining Technique, Introduction to Memory Mapping, Basic concept of Cache and Virtual Memory

Unit 11: Memory and I/O Interfacing [7 hours, 7 marks]

I/O processor, Priority Encoder, Device Scheduler, Interfacing with the I/O Devices, keyboard, printer and display interfaces

Unit 12: External Memory [10 hours, 7 marks]

Magnetic Disk, Magnetic read write operation, sector, track, inter track and inter sector gap, cylinder, fixed head disk, seek time, access time, transfer time, rotational delay, RAID, Optical memory, Magnetic tap

Unit 13: Processor structure and Function [10 hours, 7 marks]

Processor organization: Fetch instruction, Interpret instruction, fetch data, process data, write data, Registrar organization, Control and status registrar, Instruction cycle, Instruction pipelining (definition only)

Unit 14: Introduction to Parallel Processing [6 hours, 5 marks]

Introduction to Pipelining and Basics of Parallel Processing, Scalable Architecture

Unit 15: CISC and RISC Architecture [6 hours, 5 marks]

CISC (Complex Instruction Set Computers), RISC (Reduced Instruction Set Computers), Examples of CICS and RISC

BCA (S4)14 Programming in Java (Total Marks: 50+10+40)

4 credits: 120 hours of learning

Unit 1: Introduction to JAVA [5 hours, 5 marks]

An overview of JAVA, Object-oriented programming features, Comparison of Java with C and C++, JAVA Applets, Java Script, Applications, Difference between Java Script and JAVA

Unit 2: Java Programming Basics [5 hours, 5 marks]

Java Token & Keywords, Constants, Data types; The JAVA class libraries, Declaring a variable, The scope and lifetime of variable, Input/output statement in java, reading numeric and string data through keyboard

Unit 3: Operators [5 hours, 5 marks]

Definition, different operators like arithmetic, relational, logical, unary minus and plus, auto increment and decrement, bitwise operator, shift, ternary operator, string operator

Unit 4: Decision Statements [5 hours, 5 marks]

Decision Making: if statement, If-else, else-if, switch statement; nested if

Unit 5: Looping [5 hours, 5 marks]

Introduction, for, while, do, while loop, nested loop

Unit 6: Class in Java [5 hours, 7 marks]

Class fundamentals: Defining class, Accessing class members, Declaring objects, Passing Arguments to Methods, Returning Multiple Values from methods, Modifiers

Unit 7: Arrays, Strings and Vectors [10 hours, 10 marks]

Declaring Arrays, Creating Arrays, Initializing Arrays, System Array copy(), Multi-Dimensional Arrays, Strings: string arrays, string methods, string buffer class, Vectors, Constructors, copy constructor, Recursive class

Unit 8:Inheritance and Polymorphism [10 hours, 8 marks]

Inheritance basics, Multilevel Inheritance, Method overriding, Polymorphism, Final and abstract keyword, Static Members

Unit 9: Packages and Interfaces [10 hours, 8 marks]

Packages: Defining a package, Understanding class path, Importing Packages, Interfaces: Defining an Interface, Implementing interfaces, Applying Interfaces, Variable in interfaces

Unit 10: Exception Handling [10 hours, 8 marks]

Exception handling fundamentals, Exception types, Un-caught exceptions. Using try and catch JAVA's build-in exceptions, User defined exception subclasses

Unit 11: I/O in Java [10 hours, 5 marks]

I/O Basics: Streams, The stream classes, predefined streams, Reading console input, Writing console output, Reading and writing files

Unit 12: Introduction to Applets [10 hours, 8 marks]

Applets and the World Wide Web, The Applet Class, Applets and HTML , The Life Cycle of an Applet, Responding to Events, Using Window Components, Adding Audio and Animation

Unit 13: AWT [10 hours, 7 marks]

AWT Basics, AWT Components, Containers, Event Handling, Application and Menus;

Unit 14: Swings [10 hours, 7 marks]

Swings: Introduction, Swing Components, Event Handling, Display text and image in a window, Layout manager.

Unit 15: Database handling using JDBC [10 hours, 7 marks]

An overview of DBMS, JDBC architecture, Data Base Connectivity, ODBC API, JDBC API, Obtaining a connection, Steps for creating ODBC DSN, Working with ResultSet, Query Prepared Statement

BCA (S4)15 Environmental Studies (Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1: Concept of Environmental Studies [10 hours, 10 marks]

Definition of Environmental Studies and its Scope; Environmental Studies and its Multi Disciplinary Nature; Rules and Regulations of Environmental Studies and Public Awareness

Unit 2: Natural Resources [15 hours, 15 marks]

Natural Resources; Types of Natural Resources; Forest Resources; Water Resources; Mineral Resources; Food Resources; Energy Resources; Land Resources; Conservation of Natural Resources; Sustainable Development

Unit 3: Ecosystem [15 hours, 15 marks]

Ecosystem; Food Chain; Food Web; Energy Flow; Ecological Pyramid; Main Ecosystems

Unit 4: Biodiversity and its Conservation [20 hours, 15 marks]

Definition of Biodiversity; Values of Biodiversity; Biodiversity at Global, National and Local Levels; Hotspots of Biodiversity; Endangered and Endemic Species; Threats to Biodiversity Conservation of Biodiversity

Unit 5: Environmental Pollution [20 hours, 15 marks]

Environmental Pollution-Definition; Air Pollution; Water Pollution Soil Pollution; Noise Pollution; Thermal Pollution; Role of Individual in Prevention of Pollution

Unit 6: Concept of Disaster [20 hours, 15 marks]

Defining Disasters; Types of Disasters; Difference between Hazard: Disaster, Risk and Vulnerability; Causes, Effects and Mitigation Measures of Some Natural Disasters; Manmade Disasters

Unit 7: Disaster Management [20 hours, 15 marks]

Disaster Management; Safety Measures Immediately before a Disaster; Emergency Aid; Methods or Steps Taken for Disaster Management; NGO and Participation of Civil Society; Regional Disaster Management and Planning

BCA(S4)16 Software Engineering (Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1:Introduction to Software Engineering [6 hours, 5 marks]

Introduction: Need and Importance, Performance, Evolution of Software Engineering, Software crisis, Software Development Projects: Programs versus Products.

Unit 2: System Development Methodologies [10 hours, 10 marks]

System Development Phases, Software Life Cycle Model, Software Development Models: Classical and Iterative Waterfall Model, Prototyping Model, Evolutionary Model, Spiral Model, Comparison of different Models.

Unit 3: Software Project Management [10 hours, 10 marks]

Software Project Manager, Project Planning, Project Estimation Techniques, Empirical method of Estimation, Heuristic method of Estimation- COCOMO Model, Analytical method of Estimation, Risk Management, Configuration Management.

Unit 4: Staffing and Scheduling [6 hours, 5 marks]

Staffing, Cost Estimation, Scheduling, Work Breakdown Structure, Activity Networks, Critical Path, Gantt Charts, PERT Charts

Unit 5: Role of System Analyst [6 hours, 5 marks]

System Analyst, Knowledge and Qualities of System Analyst, Role of a System Analyst.

Unit 6: Requirement Analysis and Specification [10 hours, 10 marks]

Fact Gathering, Requirement Analysis, Feasibility Study and Types, User Transaction Requirement, User Design Requirements, System Requirement Specification (SRS), Functional Requirements of SRS, Organization of SRS

Unit 7: Software Design [10 hours, 10 marks]

Modules Concepts and Types of Modules, Structured Chart, Qualities of Good Design: Coupling, Types of Coupling, Cohesion, Types of Cohesion, Approaches to Software Design, Function-Oriented Design, Object-Oriented Design

Unit 8: Function-Oriented Software Design [6 hours, 7 marks]

Entity-Relationship Diagrams, Decision Tree and Decision Table, Data Flow Diagrams (DFD), Data Dictionary :Elements of DD, Advantage of DD; Pseudo code, Input And Output Design.

Unit 9: Object-Oriented Software Design [6 hours, 7 marks]

Unified Modeling Language (UML), UML Diagrams, Use Case Model, Class Diagrams, Activity Diagrams

Unit 10: User Interface Design [10 hours, 6 marks]

Characteristics of a Good User Interface, Basic Concept: User Guidance and Online Help, Modeless Interface, Graphical User Interface (GUI) vs. Text-based User Interface, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

Unit 11: Software Coding [8 hours, 5 marks]

Coding, Coding Standards and Guidelines, Code Review: Code Walkthrough, Code inspection, Clean room testing, Software Documentation, Internal Documentation, External Documentation.

Unit 12: Software Testing [8 hours, 5 marks]

Software Testing, Testing Strategies, Types of Testing: Black-Box Testing, White-Box Testing, Stress Testing, Storage Testing, Performance Testing, Unit Testing, Integration Testing .

Unit 13: Software Reliability and Quality Management [10 hours, 5 marks]

Software Reliability, Hardware versus Software Reliability, Reliability Matrics, Reliability Growth Modelling, Statistical Testing, Software Quality, Software Quality Management System, Evolution of Quality Systems, Product Metrics versus Process Metrics

Unit 14: Software Maintenance [7 hours, 5 marks]

Software Maintenance, Types of Software Maintenance, Software Reverse Engineering, Maintenance Cost

Unit 15: Case Tools   [7 hours, 5 marks]

Introduction to CASE, Building Blocks of CASE, Integrated CASE Environment.

BCA(S3)17A: Geographical Information System (GIS)

(Total Marks: 80+20)

4 credits: 120 hours of learning

Designing of syllabus under process

BCA (S3)17B: Fundamentals of Cloud Computing (Total Marks: 80+20)

4 credits: 120 hours of learning

Unit 1: Overview of Computing Paradigm [6 hours, 5 marks]

Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing, Evolution of cloud computing, Business driver for adopting cloud computing

Unit 2: Introduction to Cloud Computing [6 hours, 5 marks]

Cloud Computing (NIST Model), Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers, Properties, Characteristics & Disadvantages, Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing, Role of Open Standards

Unit 3: Cloud Computing Architecture I: Introduction [10 hours, 8 marks]

Cloud computing stack, Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services

Unit 4: Cloud Computing Architecture II: Service Models [10 hours, 8 marks]

Service Models (XaaS), Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS)

Unit 5: Cloud Computing Architecture III: Deployment Models [7 hours, 6 marks]

Deployment Models, Public cloud, Private cloud, Hybrid cloud, Community cloud

Unit 6: Introduction to IaaS [9 hours, 7 marks]

IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine (VM)

Unit 7: Resource Virtualization [10 hours, 8 marks]

Resource Virtualization, Server, Storage, Network, Virtual Machine (resource) provisioning and manageability, storage as a service, Data storage in cloud computing (storage as a service), Examples: Amazon EC2, Renting, EC2 Compute Unit, Platform and Storage, pricing, customers, Eucalyptus

Unit 8: Introduction to PaaS [9 hours, 7 marks]

Introduction to PaaS, What is PaaS, Service Oriented Architecture (SOA)

Unit 9: Cloud Platform and Management [7 hours, 8 marks]

Cloud Platform and Management, Computation and Storage Issues, Examples, Google App Engine, Microsoft Azure

Unit 10: Software as a Service (PaaS) [8 hours, 7 marks]

Introduction to SaaS, Web services, Web 2.0, Web OS, Case Study on SaaS

Unit 11: Service Management in Cloud Computing [7 hours, 7 marks]

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

Unit 12: Data Management in Cloud Computing [7 hours, 5 marks]

Managing Data, Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing

Unit 13: Cloud Security [8 hours, 6 marks]

Infrastructure 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

Unit 14: Identity and Access Management [7 hours, 6 marks]

Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations

Unit 15: Case Studies [9 hours, 7 marks]

Case Study on Open Source & Commercial Clouds: Eucalyptus, Microsoft Azure, Amazon EC2

BCA(S5)18: Web Technology (Total Marks: 50+10+40)

4 credits: 120 hours of learning

Unit 1: Basics of Internet and Web [5 hours, 5 marks]

The basics of Internet, World Wide Web, Web page, Home page, Web site, Static, Dynamic and Active web page, Overview of Protocols – Simple Mail Transfer Protocol, Gopher, Telnet, Emails, FTP, Hyper Text Transfer Protocol, Client server computing concepts, MIME, Web Surfing

Unit 2: Web Client [5 hours, 5 marks]

Web Browser, Browsers e.g., Netscape navigator, Internet Explorer, Mozilla Firefox, Client-Side Scripting Languages- VB Script and Java Script, Active X control and Plug-ins

Unit 3: Web Sever[5 hours, 5 marks]

Web Server Architecture, Image maps, CGI, API web database connectivity-DBC, ODBC, Proxy Server

Unit 4: Introduction to HTML [7 hours, 7 marks]

Introduction to HTML, Essential Tags, Tags and Attributes, Text Styles and Text Arrangements, Text, Effects, Exposure to Various Tags (DIV, MARQUEE, NOBR, DFN, HR, LISTING, Comment, IMG), Color and Background of Web Pages, Attributes of Image Tag, Hypertext, Hyperlink and Hypermedia, Links, Anchors and URLs, Links to External Documents

Unit 5: HTML Lists and Tables [7 hours, 7 marks]

Lists, Unordered Lists, Ordered Lists, Definition Lists, Tables, TABLE, TR and TD Tags, Cell Spacing and Cell Padding, Colspan and Rowspan

Unit 6: HTML Frames and Form [7 hours, 7 marks]

Frame, Frameset, FRAME Tag, NOFRAMES Tag, Forms, FORM and INPUT Tag, Text Box, Radio Button, Checkbox, SELECT Tag and Pull Down Lists, Hidden, Submit and Reset

Unit 7: Cascading Style Sheet[10 hours, 7 marks]

Cascading Style Sheets (CSS), Inline Style, Embedded Style, External Style Sheet, Imported Style Sheet, Creating a CSS file, Using CSS in a web page

Unit 8: Dynamic HTML[10 hours, 7 marks]

Dynamic HTML, Document Object Model, Features of DHTML, CSSP (Cascading Style Sheet Positioning) and JSSS (JavaScript assisted Style Sheet), Layers of Netscape, The ID Attribute, DHTML Events.

Unit 9: Introduction to JavaScript[7 hours, 7 marks]

Introduction, Language Elements: Identifiers, Expressions, Operators, Statement Functions

Unit 10: Objects in JavaScript [7 hours, 7 marks]

Objects: Window, Document, Form Objects, TextBox, TextArea, Button, Radio Button, CheckBox, Select Objects, Date, Match, String Objects; Regular Expression, Arrays

Unit 11: AJAX Basics [10 hours, 7 marks]

Introduction, AJAX, XML http Request Object, AJAX Request, AJAX Response, AJAX Events

Unit 12: XML [10 hours, 7 marks]

XML - Declaration, Root Element, Child Elements, Element Attributes, Entity References, Comments.

Unit 13: Introduction to PHP [10 hours, 7 marks]

Server Side Programming , Introduction to PHP, Basic Programming Concepts of PHP: Variables, Data-types, Constants, Scope of Variables, Type of Variables, Type Casting, Operators, Operators Precedence, References

Unit 14: Control statements in PHP [10 hours, 7 marks]

Control Structures: Branching, If statement, Switch statement; Looping: for Loop, while Loop, do while Loop, for each Loop; Arrays;

Unit 15: Functions in PHP [10 hours, 8 marks]

Functions: User Defined Functions, Built-in Function, Functions for Variables; Script Controlling Functions, Array Functions, Date and Time Functions, Mathematical Functions, String Functions, PHP Server Variables; Working with form, Uploading files to Web Server using PHP

BCA(S5)19: Computer Graphics (Total Marks: 80+20)
4 credits: 120 hours of learning

Unit 1:Introduction to Computer Graphics [5 hours, 5 marks]

Definition, Application Areas of Computer Graphics (CAD, CAM, Education and Training, Entertainment, Image Processing, Computer Art etc.), Graphical User Interfaces (GUI)

Unit 2: Graphics Systems [5 hours, 5 marks]

Cathode Ray Tubes, Random Scan Displays, Raster Scan Displays, Color CRT Monitors, Flat-Panel Displays (Plasma-Panels, Liquid Crystal Displays(LCD), Electroluminescent displays), Graphics Software (GKS, PHIGS)

Unit 3:Line Drawing Algorithms [8 hours, 7 marks]

Points and Lines, Line Drawing Algorithms (DDA Algorithm, Bresenham's Line Algorithm)

Unit 4:Circle and Ellipse Drawing Algorithms [8 hours, 7 marks]

Circle drawing algorithms, Ellipse Drawing algorithms

Unit 5: Filled area algorithms [8 hours, 6 marks]

Filling (Scan-Line Polygon filling, Inside outside tests, Boundary-fill and Flood-fill algorithm)

Unit 6:Transformations [10 hours, 8 marks]

Basic 2-D Transformations (Rotation, Reflection, shearing, scaling), Homogeneous Coordinate Representation, Translation, 3-D transformations

Unit 7: 2-D Viewing [10 hours, 8 marks]

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions

Unit 8: Clipping Algorithms [10 hours, 8 marks]

Line and polygon clipping algorithms (Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm)

Unit 9: 3-D Object representation [10 hours, 8 marks]

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Basic illumination models, polygon rendering methods

Unit 10: Bezier and B-spline curves [9 hours, 7 marks]

Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces

Unit 11: Projections [9 hours, 8 marks]

Projection Classification, Parallel projections, Perspective projections (One point, Two point), Hidden Layer Projection

Unit 12: 3-D Geometric transformations [8 hours, 8 marks]

Translation, rotation, scaling, reflection and shear transformations, composite transformations

Unit 13: 3-D viewing [8 hours, 5 marks]

Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping

Unit 14: Basics in Animation [6 hours, 5 marks]

Animation Basic, Computer Animation, Principles of Animation, Types of Animation, Animation Software (Maya, etc) and Hardware, Common Terms in Animation

Unit 15: Animation Designing [6 hours, 5 marks]

Design of Animation sequence, Morphing, Application of Computer Animation, Future of Animation

BCA (S5)20A: Data Warehousing and Data Mining
(Total Marks: 50+10+40)
4 credits: 120 hours of learning

Unit 1: Introduction to Data mining [5 hours, 6 marks]

Data mining, various types of Data, Data Mining Functionalities, Classification of Data mining Systems, Data mining Task Primitives, Integration of Data Mining System, Major issues in Data Mining

Unit 2: Introduction to Data Warehousing [7 hours, 8 marks]

Data Warehouse and DBMS, The need for data warehousing, Operational & Informational Data Stores, Data Warehouse Characteristics, Building a Data Warehouse, Design/Technical/Implementation Considerations, Data Warehouse role & Structure, The cost of warehousing data

Unit 3: Introduction to OLAP [5 hours, 5 marks]

Introduction to OLAP & OLTP, Difference between OLAP & OLTP, OLAP Operations

Unit 4: Data preprocessing [6 hours, 5 marks]

Data preprocessing, Data Summarization, Data Cleaning, Data Transformation, Data reduction, Concept Hierarchy, Structure

Unit 5: Multidimensional Data [5 hours, 5 marks]

Multidimensional Data Model, Schemas for Multidimensional Data (Star Schema, Snowflake Schema, Fact Constellation)

Unit 6: Data Warehouse Architecture [10 hours, 8 marks]

Data Warehouse Architecture, Data Warehouse Design, OLAP Three -tier Architecture, Indexing & Querying in OLAP, OLAM, Implementation from Data Warehouse to Data mining

Unit 7: Data mining knowledge representation [10 hours, 7 marks]

Task relevant data, Background knowledge, Interestingness measures, Representing input data and output knowledge, Visualization techniques

Unit 8: Attribute-oriented analysis [10 hours, 7 marks]

Attribute generalization, Attribute relevance, Class comparison, Statistical measures

Unit 9: Association Rule mining [10 hours, 7 marks]

Association Rule Mining, Market Basket Analysis, Apriori Algorithm, Mining Multilevel Association Rules, From Association Mining to Correlation Analysis

Unit 10: Classification [10 hours, 8 marks]

Introduction to Classification, Classification by Decision Tree, Attribute Selection Measure, Covering rules

Unit 11: Prediction [10 hours, 8 marks]

Introduction to Prediction techniques, Statistical (Bayesian) classification, Bayesian networks, Instance-based methods (nearest neighbor)

Unit 12: Evaluation [10 hours, 8 marks]

Training and Testing, Evaluating accuracy of a Classifier, Cross-Validation, Combining multiple models (Bootstrap, Boosting, Bagging)

Unit 13: Clustering [10 hours, 10 marks]

Introduction to Clustering, Classification of Various Clustering Algorithms, Partitioning methods- k-means, Density based DB-SCAN, Hierarchical methods- agglomerative and divisive clustering

Unit 14: Introduction to Web Mining [6 hours, 4 marks]

Web Mining introduction, web content mining, web structure mining, web usage mining, text mining, unstructured text, episode rule discovery for text

Unit 15: Introduction to Spatial and Temporal Data Mining [6 hours, 4 marks]

Temporal Data Mining, Temporal Association Rules, Sequence Mining, Spatial Mining, Spatial Mining tasks, spatial clustering

BCA (S5)20B: Linux System Administration (Total Marks: 50+10+40)

4 credits: 120 hours of learning

Unit 1: Introduction to System Administration [6 hours, 5 marks]

Introduction to System Administration, Role and power of System Administrator, Qualities of good System Administrator

Unit 2: Introduction to LINUX Operating System [7 hours, 5 marks]

Basic Features of the Linux operating system. A brief Overview of the most popular Linux Distributions – (Red Hat Enterprise Linux (RHEL), Ubuntu, Debian, Fedora, SUSE)

Unit 3: Installation of LINUX Operating System [10 hours, 5 marks]

Installation Requirements, Partitioning the Hard drive in Linux, Installing the Linux system, Installing and Configuring software in Linux

Unit 4: LINUX Kernel [10 hours, 10 marks]

Linux kernel and device drivers, System Startup and Shutdown, Standard I/O, Standard error, Redirection and Piping

Unit 5: Basics of LINUX File System [8 hours, 7 marks]

Basics of Linux file system - File system types (ext3, ext4, xfs, jfs, ReiserFS, iso9660 etc.), three basic types of files (ordinary or regular, special or device and directory).I-nodes and file attributes

Unit 6: File organization [7 hours, 7 marks]

Absolute and Relative path names, File system Mounting and Unmounting, Organization of the file tree, Standard directories and their contents

Unit 7: LINUX File Handling Commands [8 hours, 6 marks]

Files and Directory handling Commands - ls, cd, cp, mv, rm, mkdir, rmdir, Commands for Creating and Viewing ordinary files – cat, more, pg

Unit 8: LINUX Filter Commands [8 hours, 8 marks]

Filter Commands – wc, head, tail, cut, tr, grep (with regular expressions). Setting user and group ownership of files and Access permissions – chmod, chown, chgrp commands

Unit 9: LINUX Shells [10 hours, 8 marks]

Study of different Linux Shells (sh, bash, csh, zsh), Environment variables, Shell script basics (examples of some simple shell programming)

Unit 10: Process [7 hours, 7 marks]

Basic commands for starting and stopping processes, Basic process attributes and their role in Access control. Examining the list of running processes on the system and understand the data

presented there. Background process, Job control, Crontab file format, Backup and Restore procedure

Unit 11: Printing Jobs [7 hours, 5 marks]

Submit a print job, check the status of a print job, cancel a print job, configuring the Print Queue, Selecting the Print Driver, Editing the Printer configuration

Unit 12: Linux Users [8 hours, 7 marks]

Understanding the "root" account, Becoming a Superuser (su), A limited su (sudo) Managing user accounts - Adding a new user, Modifying and Removing User accounts, Changing Password, System monitoring and logging, Monitoring memory usage, disk space usage and I/O activity

Unit 13: Networking in LINUX [8 hours, 7 marks]

The rules governing IP address classes and netmasks, Network Address, Netmask and Gateway configuring Interface with ifconfig, ping, netstat, traceroute, telnet, understanding the significance of the /etc/services file and well known port numbers

Unit 14: Network Protocols [8 hours, 7 marks]

Basics of configuring NFS, NIS, DNS, FTP, Squid Proxy, DHCP server, ip tables and firewall

Unit 15: Basic Network Security Issues [8 hours, 6 marks]

Introduction to Basic Network Security Issues, Packet Snifflers, DOS Attacks, Linux Kernel Firewalling, Virtual Private Networks

BCA (S6)21: Image Processing (Total Marks: 50+10+40)

4 credits: 120 hours of learning

Unit 1: Fundamental of image [6 hours, 5 marks]

Definition of image, Analog image, digital image, Advantages & disadvantages of digital image, digital image representation, pixel, neighbours of pixel

Unit 2: Image Sampling [6 hours, 5 marks]

Introduction, Theory of 2D sampling, violation of sampling criterion, quantization, Resolution, Anatomy of the human visual system

Unit 3: Digital Image [8 hours, 8 marks]

Classification of digital image : Raster image, vector image, Image types : Binary image, grayscale image, color image, multispectral image, hyper spectral image, Elements of image processing system : Image sensor, acquisition, CCD sensor, CMOS image sensor comparison of CCD and CMOS sensors, Digital camera, Image file format, GIF file format, JPEG, PNG, TIFF, PSD, EPS, BMP, Application of digital image processing

Unit 4: Image Transform [10 hours, 8 marks]

Introduction, need for transform, Image transform, classification of image transform ,Fourier transform, 2D discrete Fourier transform, Properties of 2D DFT: Separable, spatial shift property, periodicity, convolution, correlation properties, scaling property, rotation property

Unit 5: Image enhancement in spatial domain [10 hours, 7 marks]

Introduction, Image enhancement in spatial domain: point operation, mask operation, Types of point operation: Brightness modification, contrast adjustment

Unit 6: Image Histogram [6 hours, 5 marks]

Introduction, histogram equalization, procedure to perform histogram equalization

Unit 7: Filtering [8 hours, 8 marks]

Introduction, Spatial filtering, linear filtering, low pass filter, limitations of low pass filter, weighted average filter, Bartlett filter, Gaussian filter, Median filter, High pass filtering

Unit 8: Image enhancement in frequency domain [8 hours, 6 marks]

Introduction, Low pass filtering in frequency domain, High pass filter in frequency domain, Butterworth high pass filter, Homomorphic filter

Unit 9: Image Restoration [10 hours, 8 marks]

Introduction, Image degradation, Types of image Blur, Classification of Image Restoration technique, Image restoration model, Linear Image Restoration techniques, Pseudo Inverse filter, Wiener filter, Non Linear Image Restoration techniques : Iterative method, Maximum likelihood Method, Stochastic image restoration technique

Unit 10: Image noise [8 hours, 8 marks]

Introduction, classification of noise image: adaptive noise, Multiplicative noise, impulse noise, Median filtering, trimmed average filter

Unit 11: Image segmentation [10 hours, 8 marks]

Introduction, Classification of Image segmentation technique, Local and global segmentation, region approach to image segmentation, clustering technique, Image segmentation based on thresholding, Limitation, edge detection techniques, edge linking, Watershed transformation

Unit 12: Image compression [10 hours, 7 marks]

Introduction, Need for Image compression, Redundancy in images, Image compression scheme Huffman coding, Arithmetic coding, transform base coding, Vector quantization

Unit 13: Binary Image Processing [8 hours, 7 marks]

Introduction, Binarisation, Mathematical morphology, structuring element, Morphological image processing, Basic set theory, Logical operations, Standard binary morphological operations : Dialation, Erosion, Opening, Closing, Properties of Morphological operations

Unit 14: Color Image processing [6 hours, 5 marks]

Introduction, Color formation, Human perception of color, Color model: RGB model, CMY color model, HIS color model, YIQ color model, Histogram equalization of color image, Color Image filtering

Unit 15: Wavelet-based Image Processing [6 hours, 5 marks]

Introduction, Wavelet, Wavelet transform, 2D continuous wavelet transform, Discrete wavelet transform, Haar Wavelet, Filter bank, Embedded Image coding

BCA (S6)22: Open Source Software (Total Marks: 50+10+40**)**

4 credits: 120 hours of learning

Unit 1: Installation to LaTeX [6 hours, 5 marks]

Installation of LaTeX, Understanding Latex compilation

Unit 2: Introduction of LaTeX [8 hours, 7 marks]

Basic Syntax, Writing equations, Matrix, Tables

Unit 3: Page Layout – I [10 hours, 10 marks]

Page Layout – Titles, Abstract Chapters, Sections, References, Equation references, citation, Table of contents

Unit 4: Page Layout – II [10 hours, 9 marks]

List making environments, Generating new commands, Figure handling, table & figure numbering, List of figures, List of tables, Generating index

Unit 5: Packages [8 hours, 7 marks]

Packages: Geometry, Hyperref, amsmath, amssymb, algorithms, algorithmic graphic, color, tilez listing

Unit 6: Classes [8 hours, 7 marks]

Classes: article, book, report, beamer, slides, letter

Unit 7: Applications of LaTex [6 hours, 5 marks]

Applications: Writing Resume, Writing question paper, Writing articles/ research papers, Presentation using beamer, inserting graphics, drawing graphics, putting equations like :

$$(x + a)^n = \sum_{k=0}^{n} \binom{n}{k} x^k a^{n-k},$$

$$(1 + x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \cdots,$$

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos \frac{n\pi x}{L} + b_n \sin \frac{n\pi x}{L} \right)$$

$$, e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots, -\infty < x < \infty$$

Unit 8: Installation of Scilab [6 hours, 5 marks]

Installation of Scilab (both windows & Linux)

Unit 9: Introduction to Scilab [8 hours, 5 marks]

Introduction to scilab, Basic syntax, Mathematical Operators, Predefined constants, Handling .sci files, Installation of additional packages e.g. optimization

Unit 10: Functions in Scilab [10 hours, 8 marks]

Built in functions, Complex numbers, Polynomials, Vectors, Matrix operations (functions like inv(), spec(), zeros(), ones(), eye(), rand(). Handling these data structures using built in functions. Functions

Unit 11: Conditional Statements in Scilab [10 hours, 6 marks]

Loops (for & while), Conditional statements

Unit 12: Graphics in Scilab [10 hours, 8 marks]

Graphics handling: 2D, 3D, Generating .jpg files, Function plotting, Data plotting, GUI in scillab, Plotting 2D graphs

Unit 13: Applications of Scilab [7 hours, 6 marks]

Applications: Numerical Linear Algebra (Solving linear equations, eigen values atc.) solving Ordinary Differential Equations, Numerical Analysis – iterative methods, Comparison with C/C++/Matlab

Unit 14: Introduction to Python [6 hours, 5 marks]

Introduction to Python, The procedure to install Python, How to open Python console

Unit 15: Basic Python Commands [7 hours, 7 marks]

Basic Python commands, Python programming

BCA(S6)23: Project

8 credits: 240 hours of learning

A. PROJECT GUIDE

Eligibility criteria:

Full Time Faculties in the Department of Computer Science/ Information Technology of KKHSOU/ Colleges/ Institutions affiliated to any Indian University recognized by UGC and having minimum 2 years teaching experience.

OR

A person having minimum M. Tech., MCA, M.Sc. in Computer Science/Information Technology from a UGC recognized universities with 4 years experience in Industry/teaching.

B. PROJECT PROPOSAL FORMULATION

The proposal may be application oriented or research & development oriented. At the time of formulating the proposal the goals, scope and expected outcome of the project should mentioned clearly.

TYPE OF PROJECT

A learner may choose any topics according to MCA standards. Most of the project work falls under the following types

    a.   Database oriented (e.g. payroll system, Loan management system etc.)

    b.   Application oriented (e.g. Mobile apps development)

    c.   R & D project (e.g. Image processing, speech processing, data mining, networking etc)

C. PROJECT PROPOSAL (SYNOPSIS)

The project proposal or the synopsis is the frame work for carrying out the project. It should be prepared in consultation with Guide. The necessary parts of a project proposal are given in the following form:

* Title of the Project.

* Introduction and Objectives of the Project.

* Project Category (RDBMS/ Application/ R & D).

* Tools, Platform, Hardware and Software Requirement specifications.

* Whether the project is done for any Industry/Client? The Name and Address of the Industry or Client is to be mentioned.

* Methodology

* Conclusion

D. APPLICATION AREAS & RELATED TOOLS

A list of selected area for developing the project work is given below:

APPLICATIONS : Financial/ Manufacturing/ Multimedia/ Computer Graphics/ Instructional Design/ Database Management System/ Internet/ Intranet/ Computer Networking-Communication Software/E-Commerce/TCP/IP Internals/ Routing protocols/ Implementation of Switches & Routers/ Image processing,/ Mobile apps development/ etc..

Related Tools:

FRONT END / GUI Tools: PhP, Scripting languages etc.

RDBMS/BACK END: Oracle, MYSQL, No SQL, DB2 etc.

LANGUAGES : C, C++, Java, VC++, C#, Matlab, Python, Scilab etc.

INTERNET TECHNOLOGIES : DHTML, Java script, VB Script, HTML, Java, Active X, SWING, JSP,ASP, PHP, XML, Java Beans, Java Servlets, CSS, VB.Net,AWT, J2EE.

NETWORKING TECHNOLOGIES : ATM, Frame Relay, TCP/IP, SNMP, GSM, VoIP, PPP, IP-PSTN, SONET/SDH

WIRELESS TECHNOLOGIES: BlueTooth, 3G, ISDN, EDGE

OPERATING SYSTEMS: WINDOWS/ DOS / UNIX / LINUX /ANDROID.

PROJECT REPORT GUIDELINE

The Project report should prepared in well structured preferably typed in Latex. Depending on the type of project the report structure should be as follows

Database project:
Acknowledgement
Content with page number
Declaration Certificate
Certificate from Guide

CHAPTER I: INTRODUCTION

    1.1   Brief idea about the project
    1.2   Objective of the project
    1.3   Scope of the project
    1.4   Existing system
    1.5   Proposed System
    1.6   Platform used(Hardware & Software)
    1.7   Project location

CHAPTER II: REQUIREMENT ANALYSIS

    2.1   Introduction
    2.2   Tools used for Requirement gathering
    2.3   Problem in Existing System
    2.4   Conclusion

CHAPTER III: LOGICAL DESIGN

    3.1   Introduction
    3.2   DFD (0th, 1st, 2nd level)
    3.3   ER diagram
    3.4   Use case diagram
    3.5   Activity diagram
    3.6   Conclusion

CHAPTER IV: PHYSICAL DESIGN

    4.1 Introduction
    4.2 Database Design (Give your normalized database here)
    4.3 Module design
    4.4 Input/output design
    4.5 Conclusion

CHAPTER V: IMPLEMENTATION

    5.1 Introduction
    5.2 Process description (if any)
    5.3 Output & Report
    5.4 Conclusion

CHAPTER VI: TESTING

    6.1 Introduction
    6.2 Types of testing performed
    6.3 Conclusion

References
Appendix (if any)

R & D/ Application project:
Acknowledgement
Content with page number
Declaration Certificate
Certificate from Guide

CERTIFICATE OF ORIGINALITY FROM THE GUIDE

This is to certify that the project report entitled
.... submitted
to **Krishna Kanta Handiqui State Open University** in partial fulfillment of the requirement for
the award of the degree of **BACHELOR OF COMPUTER APPLICATIONS (BCA),** is an
original work carried out by Mr. /Ms.. Enrolment No.:
.... under the supervision of Dr./Mr./Ms...
The matter embodied in this project is a genuine work done by the student and has not been
submitted either to this University or to any other University/Institute for the fulfillment of the
requirement of any course of study.

Signature of the Learner   Signature of the Guide
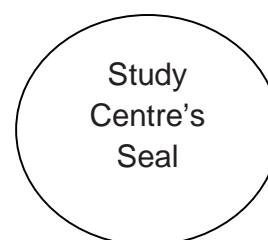
Name   Name
Address   Designation
Enrolment No.:   Address

Study
Centre's
Seal

FORMAT OF THE PROJECT REPORT

A Project Report on ———————— | Font type: Arial Size: 12, Bold |

TITLE OF THE PROJECT ———————— | Font type: Arial Size: 16, Bold |

In fulfillment of the requirement for the 6th Semester of Bachelor of Computer Application Programme

Submitted by

....

(Name of the Learner)
Enrollment No.: ....
Session: ....

Under the Guidance of

....

(Name of the Project Guide)

Study Centre

....

(Name of the Study Centre)

....

(Location)

| Font type: Arial |