PROGRAMME GUIDE
FOR
BACHELOR OF COMPUTER APPLICATIONS
(BCA)

(Revised Syllabus)
(January 2019)

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI - 110 068

www.ignou.ac.in

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Further information on the Indira Gandhi National Open University courses may be obtained from the University's office at Maidan Garhi, New Delhi-110 068.

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MESSAGE FROM PROGRAMME COORDINATOR

Dear Student,

I welcome you to the BCA Programme. IGNOU BCA Programme is structured as per latest development in the field of Computer Science Applications and keeping in view the need and requirements of the Information Technology Industry. During BCA programme, you will receive support from IGNOU through Internet as well as through the network of our Regional and Study Centres. You will be attached to a Study Centre where many of the academic activities including couselling will take place. Attend counselling sessions at your Study Centre regularly. Go in counsellng sessions with preparations, it will provide you opportunity to clear your doubts. You will receive printed course material in accordance with our dispatch schedule. The student support will also include teleconferencing sessions and interactive radio counseling (IRC) sessions. You need to have a minimum of 70% attendance in practical counselling sessions to be eligible to appear for Term End Practical Examinations. You need to submit requisite assignments before the due dates to become eligible to appear for Term End Theory and Practical Examinations.

Also, you are requested to take note of the following:

1. The study materials in soft form may be obtained from:

    http://egyankosh.ac.in/handle/123456789/10.

2. The University sends study materials, wherever prescribed, to the students by registered post and if a student does not receive the same for any reason whatsoever, the University shall not be held responsible for that.

3. You may get your assignments and BCA project guidelines, from the IGNOU website: http:// www.ignou.ac.in.

4. The students are specifically instructed to submit Re-registration Forms online.

Programme Guide is a very important document for you, as a distance learner you may have several queries, many of them would be answered by this booklet. Preserve this booklet until you successfully complete the BCA Programme. Don't forget to re-register for the semesters as per schedule as you may not be able to pursue your studies without payment of the fee before due dates. Some useful addresses are given in this Programme Guide. In case of any difficulty, communicate to the concerned, on the listed address for fast action.

IGNOU reserves the right to change any rule or regulation pertaining to BCA Programme that are specified or not specified in the Programme Guide, at any time. You are advised to visit **IGNOU website-http://www.ignou.ac.in, and your Study Center regularly for latest information if any.** I wish you success in pursuing BCA Programme.

Wishing you all the best,

BCA Programme Coordinator

Email ID : bca@ignou.ac.in

1. BASIC INFORMATION

1.1 BCA Programme Objectives

The basic objective of the programme is to open a channel of admission for computing courses for students, who have done the 10+2 and are interested in taking computing/IT as a career. After acquiring the Bachelor's Degree (BCA) at IGNOU, there is further educational opportunity to go for an MCA at IGNOU or Master's Programme at any other University/Institute. Also after completing BCA Programme, a student should be able to get entry level job in the field of Information Technology or ITES.

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

In case the student is unable to pass all the courses of the BCA within the prescribed maximum duration of 6 years, s/he can apply for **extension of the duration by another two years by seeking Re-admission on remitting the pro-rata fee of the left-over courses.** For Re-admission Form, rules and regulations and Table of pro-rata fee, you may either contact concerned Regional Centre/ Student Registration Division or download it from website (http://www.ignou.ac.in>StudentZone>**Downloads**>Re-admission>).

1.3 Programme Fee

₹ 6000 per semester and ₹ 36000 full programme. The fees may change as and when university decides. The student may get latest update on the fees from the concerned IGNOU Regional Centre or from the Student Registration Division (SRD) or from Student Service Centre (SSC).

1.4 Medium of Instruction

The medium of instruction is only in **English.** The course material is also in English.

1.5 Credit System

The University follows the 'Credit System' for its programmes. **Each credit is worth 30 hours of student study time, comprising all the learning activities.** Thus, a three-credit course involves 90 study hours. This helps the student to understand the academic effort one has to put into successfully complete a course. **Completion of the programme requires successful completion of both assignments and the Term End Examination of each course in the programme.**

1.6 BCA Programme Structure

The programme has been divided into two semesters per year (January to June and July to December). Consequently, there will be two examinations every year - one in the month of June for the January to June semester courses and the other in December for the July to December semester courses. The students are at liberty to appear for any of the examinations schedule conducted by the University during the year subject to completing the minimum duration and other formalities prescribed for the programme. Student may ensure that s/he paid the requisite fee as well as fulfils other requirements such as prescribed minimum attendance etc. before appearing in the term end examinations. The result may be withheld or may be cancelled in case it is found that the student's registration to the course is invalid or did not register. The following is the programme structure of BCA:

BCA Programme Structure

Sem-ester	Course Code	Course Title	Credits
I	FEG-02	Foundation Course in English-2	4
	ECO-01	Business Organization	4
	BCS-011	Computer Basics and PC Software	3
	BCS-012	Basic Mathematics	4
	BCSL-013	Computer Basics and PC Software Lab	2
II	ECO-02	Accountancy-1	4
	MCS-011	Problem Solving and Programming	3
	MCS-012	Computer Organization and Assembly Language Programming	4
	MCS-013	Discrete Mathematics	2
	MCS-015	Communication Skills	2
	BCSL-021	C Language Programming Lab	1
	BCSL-022	Assembly Language Programming Lab	1
III	MCS-014	Systems Analysis and Design	3
	MCS-021	Data and File Structures	4
	MCS-023	Introduction to Database Management Systems	3
	BCS-031	Programming in C++	3
	BCSL-032	C++ Programming Lab	1
	BCSL-033	Data and File Structures Lab	1
	BCSL-034	DBMS Lab	1
IV	BCS-040	Statistical Techniques	4
	MCS-024	Object Oriented Technologies and Java Programming	3
	BCS-041	Fundamentals of Computer Networks	4
	BCS-042	Introduction to Algorithm Design	2
	MCSL-016	Internet Concepts and Web Design	2
	BCSL-043	Java Programming Lab	1
	BCSL-044	Statistical Techniques Lab	1
	BCSL-045	Algorithm Design Lab	1
V	BCS-051	Introduction to Software Engineering	3
	BCS-052	Network Programming and Administration	3
	BCS-053	Web Programming	2
	BCS-054	Computer Oriented Numerical Techniques	3
	BCS-055	Business Communication	2
	BCSL-056	Network Programming and Administration Lab	1
	BCSL-057	Web Programming Lab	1
	BCSL-058	Computer Oriented Numerical Techniques Lab	1
VI	BCS-062	E-Commerce	2
	MCS-022	Operating System Concepts and Networking Management	4
	BCSL-063	Operating System Concepts and Networking Management Lab	1
	BCSP-064	Project	8

Total: 39 Courses and 99 Credits.

1.7 Recognition

IGNOU is a Central University established by an Act of Parliament in 1985 (Act No.50 of 1985) IGNOU Degrees/Diplomas/Certificates are recognized by all member Universities of Association of Indian Universities (AIU) and are at par with Degrees/Diplomas/Certificates of all Indian Universities/Deemed Universities/Institutions vide UGC Circular No. F1-52/ 2000 (CPP-II) dated 5 May, 2004 & AIU Circular No. EV/B (449)/94/177115 dated January 14, 1994.

1.8 Associate Studentship Scheme

i) For detailed guidelines please refer to the Common Prospectus of the University.

ii) Students while pursuing BCA programme cannot enroll for any course(s) offered under the same programme under 'Associate Studentship Scheme'.

1.9 Student Support Services

In order to provide individualized support to its learners, the University has created a number of Study Centres throughout the country for this Programme. These are administratively coordinated by the Regional Centres. The Study Centres are the contact points for the students on all major aspects of the Programme. These include counselling sessions, practicals, reference library facilities, disseminating information and advice, facilities for audio-visual training aids and teleconferencing.

The University may not always be able to communicate to all the students individually. All the important communications are sent to the Regional Directors who in turn will intimate them to the Study Centre Coordinators. The coordinators display such circulars / notifications on their notice boards for the benefit of the students. *You are, therefore, advised to be in touch with your Study Centre Coordinator on a more regular basis so as to get the latest information about assignments, submission schedules (assignments and examination forms), declaration of results, etc.* You are also advised to be in touch with IGNOU website so that you are updated to the latest developments in BCA.

1.10 iGRAM

With the objective of putting in place a system for quick resolution of students problems IGNOU has developed iGRAM. **For quick response and redressal you may send your query/grievance on iGRAM at http://igram.ignou.ac.in/.**

1.11 Newsletter

IGNOU Newsletter can be accessed at **http://www.ignou.ac.in**

1.12 Contact information of BCA Programme Coordinator

Students may contact the BCA Programme Coordinator by sending a communication through post to The BCA Programme Coordinator, SOCIS, Vishveswaraiah Bhavan, C-Block, IGNOU Academic Complex, IGNOU, Maidan Garhi, New Delhi – 110068, or can send an Email to *bca@ignou.ac.in*

2. INSTRUCTIONAL SYSTEM

The methodology of instruction in this university is different from that of the conventional universities. The Open University system is more learner-oriented, and the student has to be an active participant in the teaching-learning process. Most of the instruction is imparted through a distance with only a small component of face-to-face communication. The University follows a multi-channel approach for instruction. It comprises a suitable mix of:

☞ self-instructional printed material,
☞ audio / video cassettes and CDs,
☞ audio-video programmes transmitted through AIR and Doordarshan, and at study centre,
☞ face-to-face counselling at Study Centres by academic counsellors,
☞ reference library at study centre,
☞ web based academic support: e-content available on e-Gyankosh portal,
☞ assignments,
☞ practicals,
☞ Gyan Darshan Channel, including teleconferencing, Eklavya exclusively for Technology programmes,
☞ Gyan Vani.

2.1 Print Material

Printed materials are the primary form of instructional materials. These are supplied to the learners in the form of several booklets called blocks. Each block consists of several units. The size of a unit is such that the material given therein may be expected to be studied by a student in a session of about 4 to 6 hours of study. Therefore, you have to concentrate mainly on the print materials, which we send to you. However, the fast pace of computer industry necessitates that students must do some additional readings. Students are advised to study reference books without fail. Studying the printed material alone may not be sufficient to write assignments and prepare for the term-end Examinations. Some reference books are available at your study centre. There may be delays in the receipt of printed study materials by the students owing to different reasons. However, students are advised to download the course material that is available on IGNOU website and start studying. They are also advised that they attend to the video lectures uploaded to http://www.youtube./com/ignou.

2.2 eGyankosh

You may download softcopy of your study material form eGyankosh. Weblink for BCA is: http://egyankosh.ac.in/handle/123456789/380

2.3 Audio-Video Material and CDs

These are video-cassettes meant for clarification and enhancement of understanding in various courses. However, audio / video are supplementary material and would not be available in all the courses. The audio-video material supplements the print material. Hence, we advise you to make use of it as that will help you to understand the subject better. However, audio-video material will normally not be supplied to the students individually but will be made available at the Study Centres. Students desirous of buying the audio-video tapes can procure them from:

The Director
EMPC, Sanchar Kendra
IGNOU, Maidan Garhi
New Delhi-110068
Ph./Fax:91-011-29534299

Lectures on Gyan Darshan and Interactive Radio Counselling

The live lectures based on BCA courses of SOCIS are telecasted on GD (Gyan Darshan) channel. The live telecast can be seen on http://www.ignouonline.ac.in/ .You can listen radio counseling programs on http://www.ignouonline.ac.in/. Also schedule of GD (Gyan Darshan) lectures and Intractive Radio Counselling Program (IRC) can be seen on http://www.ignouonline.ac.in/

Figure-1: IGNOU Online

Details of Availability on various platforms of Gyan Darshan Channel and Gyan Vani
Gyan Darshan Channel

Sl.No.	DTH Platform	TV Channel No.
1.	Airtel	442
2.	TATA Sky	755
3.	Sun Direct	596
4.	Den	526
5.	In Digital	297
6.	Hathway	473

Telephone number of EMPC Video Studio-2 for interaction; during live session: 011-29532844, 011-29532845, Toll Free: 1800112346, Fax: 011-29536134

Gyan Vani Channel

Sl.No.	DTH Platform	TV Channel No.
1.	DD Free Dish	44

2.4 Counseling Sessions

The details of the theory and practical Counseling sessions are given in the following sections.

2.3.1 Theory Sessions

In Open and Distance Learning (ODL) system, face-to-face contact between the learners and their tutors/counsellors is relatively less. The purpose of such a contact is to answer some of your questions and clarify your doubts that may not be possible through any other means of communication. It also provides you with an opportunity to meet your fellow students.

There are academic counsellors at the Study Centres to provide Counseling and guidance to you in the courses that you have chosen for study. Normally, these sessions will be held at the study centres on Saturdays and Sundays.

You should note that the Counseling sessions would be very different from the classroom teaching or lectures. Counsellors will not be delivering lectures as in conventional teaching.

They will try to help you to overcome difficulties that you face while studying for the BCA programme. In these sessions, you must try to resolve your subject-based difficulties and any other related issues.

> **Before attending the Counseling session for each course, please go through your course material as per the session schedule and make a plan of the points to be discussed.**

2.3.2 Practical Sessions and Compulsory Attendance

The practical sessions will be held in the computer centres / labs of the Study Centres. In these computer labs, the participants will have the facility to use the computer and software packages relevant to the syllabus. The following points regarding the practical attendance must be noted:

i) 70% attendance is compulsory for each lab course. **However, this condition is not applicable for the computer time given for assignment implementation.**

ii) This is a pre-requisite for taking the term-end practical examination in the respective lab courses.

iii) A student who fails to **fulfill the 70% attendance requirements** are **required to re-appear in the practical classes in the next session in the next session by remitting 50% of the pro-rate fee.** For fee details and the application form, please contact your Regional Centre. In case, the student appears for the term end practical examination in a course without fulfilling the minimum attendance requirements, then the result shall be withheld and University reserves the right to cancel the result.

iv) Student attendance will be recorded course-wise at the study centre.

v) Strictly follow the guidelines given in the Lab manuals for the respective lab courses.

vi) **Computer to Student ratio will be 1:2.**

2.3.3 Counselling Session Details:

Course wise Number of Counselling Sessions (Theory/Lab)				
Sem-Ester	Course	Course Title	Credits	No. of Counselling Sessions
I	FEG-02	English (Adopted from SOH)	4	**5**
	ECO-01	Business Organization (Adopted from SOMS)	4	**5**
	BCS-011	Computer Basics and PC Software	3	**9**
	BCS-012	Basic Mathematics	4	**12**
	BCSL-013	Computer Basics and PC Software Lab	2	**20**
II	ECO-2	Accountancy-1 (Adopted from SOMS)	4	**5**
	MCS-011	Problem Solving and Programming	3	**5**
	MCS-012	Computer Organization and Assembly Language Programming	4	**8**
	MCS-015	Communication Skills	2	**2**
	MCS-013	Discrete Mathematics	2	**3**
	BCSL-021	C Language Programming Lab	1	**10**
	BCSL-022	Assembly Language Programming Lab	1	**10**
III	MCS-021	Data and File Structures	4	**8**
	MCS-023	Introduction to Database Management Systems	3	**5**
	MCS-014	Systems Analysis and Design	3	**5**
	BCS-031	Programming in C++	3	**9**

	BCSL-032	C++ Programming Lab	1	**10**
	BCSL-033	Data and File Structures Lab	1	**10**
	BCSL-034	DBMS Lab	1	**10**
IV	BCS-040	Statistical Techniques (To be adopted from SOS)	4	**5**
	MCS-024	Object Oriented Technologies and Java Programming	3	**5**
	BCS-041	Fundamentals of Computer Networks	4	**12**
	BCS-042	Introduction to Algorithm Design	2	**6**
	MCSL-016	Internet Concepts and Web Design	2	**20**
	BCSL-043	Java Programming Lab	1	**10**
	BCSL-044	Statistical Techniques Lab	1	**10**
	BCSL-045	Algorithm Design Lab	1	**10**
V	BCS-051	Introduction to Software Engineering	3	**9**
	BCS-052	Network Programming and Administration	3	**9**
	BCS-053	Web Programming	2	**10**
	BCS-054	Computer Oriented Numerical Techniques	3	**9**
	BCS-055	Business Communication	2	**6**
	BCSL-056	Network Programming and Administration Lab	1	**10**
	BCSL-057	Web Programming Lab	1	**10**
	BCSL-058	Computer Oriented Numerical Techniques Lab	1	**10**
VI	BCS-062	E-Commerce	2	**6**
	MCS-022	Operating System Concepts and Networking Management	4	**8**
	BCSL-063	Operating System Concepts and Networking Management Lab	1	**10**
	BCSP-064	Project	8	**10**

<u>*Note:*</u> *For ECO-01, ECO-02, and FEG-02 courses, number of counselling sessions will be as per existing decisions / rules of the respective schools.*

Semester wise Counseling Sessions:

Semester	No. of Sessions		No. of Hours	
	Theory	**Practical**	**Theory**	**Practical**
I	31	20	62	60
II	23	20	46	60
III	27	30	54	90
IV	28	50	56	150
V	43	30	86	90
VI	14	20	28	60
TOTAL	**166**	**170**	**332**	**510**

Note: 70% attendance is compulsory in Practical Lab Counselling Sessions. However, this condition is not applicable for the time given for assignment implementation.

3. BROWSING IGNOU'S WEBSITE

IGNOU website is a dynamic source of latest information and will be undergoing continuous updates.

3.1 Navigation from Home Page

The learners can have access to IGNOU's website at the following address (URL) ***http:// www.ignou.ac.in***. As students get connected to this site, the following page displays the Home Page of IGNOU's web site (Figure 2). Students need to click on various options to get the related information.

Figure 2: IGNOU Website

Upon clicking on the Schools option the page related to the links of various schools is displayed and from there you may go to SOCIS page as shown in the Figure 3. From this page students can access the required information as described, briefly, in subsequent pages. School of Computer and Information Sciences (SOCIS) offers the Computer Programmes: PhD., MCA, BCA and CIT as shown in Figure 4.
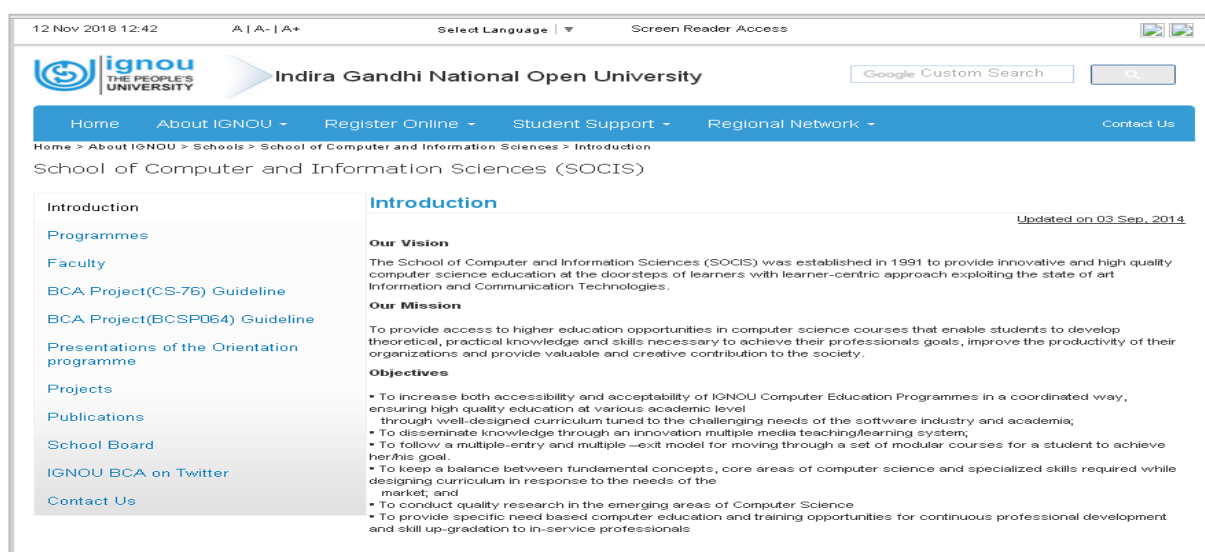
Figure 3: SOCIS Page on IGNOU Website
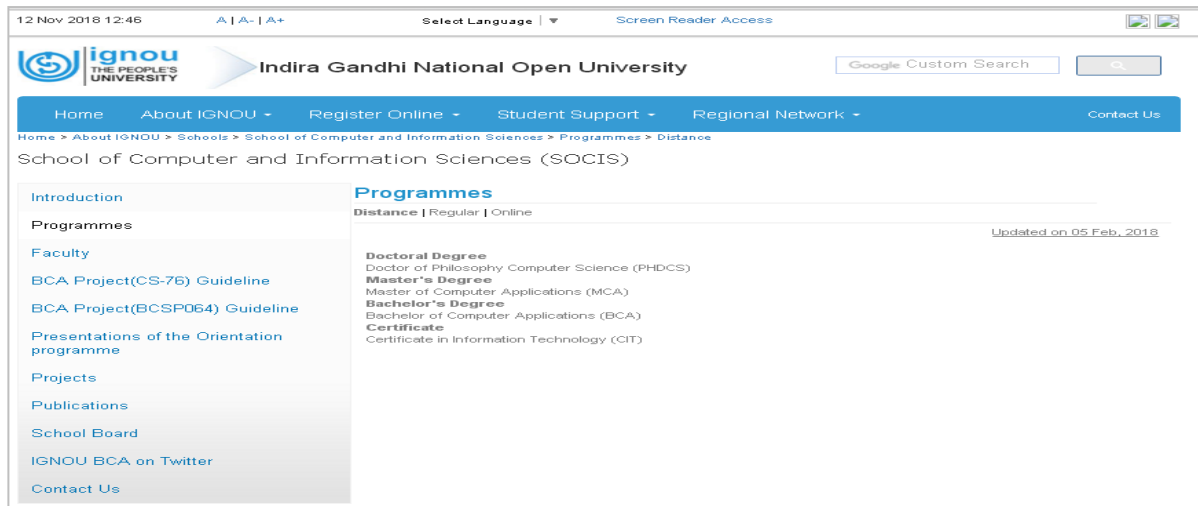
Figure 4: SOCIS Programmes

3.2 Navigation of BCA Page

School of Computer and Information Sciences provides Computer Education Programmes. As soon as School of Computer and Information Sciences link is selected, a page introducing the school is displayed as shown in the Figure 5. The page BCA page of School of Computer and Information Sciences looks like this:

Figure 5: BCA Page

You may also download Assignments **https://webservices.ignou.ac.in/assignments/bca/index.html**

Figure 6: BCA Assignment Page

4. BCA (REVISED) PROGRAMME SYLLABUS

The following is the syllabus of all the six semesters of BCA programme.

4.1 Detailed Syllabus of BCA First Semester

1. FEG-02 : Foundation Course in English -2   **4 Credits**

Block 1

    Unit 1 : Writing paragraph-1,

    Unit 2 : Writing paragraph-2, the development of a paragraph

    Unit 3 : Writing a composition

    Unit 4 : Expository composition

    Unit 5 : Note-taking 1

    Unit 6 : Writing reports-I, reporting events

Block 2

    Unit 7 : Argumentative composition-1, techniques of argument

    Unit 8 : Argumentative composition-1, logical presentation

    Unit 9 : Note taking-2, use of tables and diagrams

    Unit 10 : Writing reports-2, reporting meetings and speeches

    Unit 11 : Writing summaries-1

    Unit 12 : Writing summaries-2

Block 3

    Unit 13 : Writing paragraphs-2

    Unit 14 : Narrative composition-1

    Unit 15 : Narrative composition-2

    Unit 16 : Writing reports-3, reporting interviews

    Unit 17 : Writing reports-4, reporting surveys

    Unit 18 : Writing summaries-3

Block 4

    Unit 19 : Descriptive composition-1, describing persons

    Unit 20 : Descriptive composition-2, describing places and objects

    Unit 21 : Descriptive composition-3, describing conditions and processes

    Unit 22 : Note-taking-3,

    Unit 23 : Writing reports-5, reporting experiments

    Unit 24 : Summing up

2. ECO-01: Business Organisation　　　　　　　　　　　　　　4 Credits

This course consists of five blocks containing 18 units in all. After studying this course, you should be able to:

- Explain the nature of business organisation and identify various forms of organisation learn how business units are set up and financed

- Under the ways and means of marketing the goods

- Explain how aids-to-trade facilitate the business operations

- Evaluation the role of government in business

BLOCK 1 : Basic Concepts and Forms of Business Organisation

　　Unit 1 : Nature and scope of Business

　　Unit 2 : Forms of Business Organisation – I

　　Unit 3 : Forms of Business Organisation – II

　　Unit 4 : Business Promotion

BLOCK 2 : Financing of Business

　　Unit 5 : Methods of Raising Finance

　　Unit 6 : Long-term Financing and Underwriting,

　　Unit 7 : Stock Exchanges

BLOCK 3: Marketing

　　Unit 8 : Advertising

　　Unit 9 : Advertising Media

　　Unit 10 : Home Trade and Channels of Distribution

　　Unit 11 : Wholesalers and Retailers

　　Unit 12 : Procedure for Import and Export Trade

BLOCK 4: Business Services

　　Unit 13 : Banking

　　Unit 14 : Business Risk and Insurance

　　Unit 15 : Transport and Warehousing

BLOCK 5: Government and Business

　　Unit 16 : Government and Business

　　Unit 17 : Forms of Organisation in Public Enterprises

　　Unit 18 : Public Utilities

3. BCS-011: Computer Basics and PC Software

3 Credits

Objectives:

This is the first course in Computer Science for the BCA students; therefore, it deals with the basic concepts of computers. It discusses about the computer hardware, its components and basic computer architecture. The course also deals with the basic computer software including the operating system and its concepts. This course also highlights some of the open source software technologies. Finally, the course highlights the applications of computers that include web applications, social networking and wiki.

BLOCK 1: Basics of Computer Hardware

Unit 1: Computer their Origin and Applications

A bit of history highlighting the concepts, Abacas, Difference Engine, Electro-magnetic Computers, Discrete components, IC circuits, Current hardware Platforms, Description of current applications of computer highlighting role of computers, Limitations of Computers.

Unit 2: Functioning of a Computer

Components of a computer and their role, Number system, Codes ASCII Unicode. Concept of Instruction – a simple example, Role of ALU and CU with the help of an example.

Unit 3: Memory System

Type of memories and their characteristics, What is the need of memory hierarchy? Memory Hierarchy with examples of each level, Current trends in memory.

Unit 4: I/O Devices and their Functions

I/O devices, Current trends in I/O

Unit 5: My Personal Computer

Explain the configuration of PC and its components in respect of identification of various components so that a student can relate all the terms discussed in Unit 1 to 4 to this configuration.

BLOCK 2 : Basics of Computer Software

Unit 1: Software Evolution

Different type of software and its evolution, System and application software, Utility software, Perverse software, Open Source software.

Unit 2: Operating System Concepts

Need and Functions, Type of OS starting from Batch, Multi-programming and real time Network and distributed OS, Web OS, Examples of OS and their features.

Unit 3: Concept of Programming Languages

Some basic constructs, Editors, Compilers and interpreters, Assemblers.

Unit 4: Computer Applications

Concepts of Open Source Software, Philosophy – licensing, copyright. Project Management Software, Timesheet system, Office Applications, Word Processing – Creating a Memo for a number of people, Spreadsheet – Creating a sheet of Income & deduction and calculation of IT Database – a small application with data records, a form, a query and a report. Email – Sending mail to a number of people in a group.

BLOCK 3 : Internet Technologies

Unit 1: Networking and Internet

Basic of Networking Concepts, Advantages of Networking, Basic model of Networks, Network Devices, TCP/IP, Web addresses, DNS, IP addresses.

Unit 2: Web Applications I

Browsing, E-mail, Messenger/Chat

Unit 3: Web Applications II

Blogging, E-Learning and wiki, Collaboration, Social Networking.

4. BCS-012: Basic Mathematics   4 Credits

Objectives:

The primary objective of this course is to introduce students some of the mathematics through which they can develop some mathematical maturity, that is enhance their ability to understand and create mathematical arguments. The secondary objective of this course is to prepare students for mathematical oriented courses in computer science such as discrete mathematics, database theory, analysis of algorithms etc.

BLOCK-1: Algebra I

Unit-1: Determinants

Determinants of order 2 and 3, properties of determinants; evaluation of determinants. Area of triangles using determinants, cramer's rule.

Unit-2: Matrices-1

Definition, equality, addition and multiplication of matrices. Adjoint and inverse of a matrix. Solution of a system of linear equations – homogeneous and non-homogeneous.

Unit-3: Matrices-2

Elementary row operations; rank of a matrix, reduction to normal form,Inverse of a matrix using elementary row operations.

Unit-4: Mathematical Induction

Principle of mathematical induction 1 and 2.

BLOCK 2 : Algebra II

Unit 1: Sequence and Series
Definition of sequence and series; A.P, G.P, H.P and A.G.P. $\sum n$, $\sum n^2$ and $\sum n^3$,Idea of limit of a sequence.

Unit 2: Complex Number

Complex number in the form of a+ib. Addition, multiplication, division of complex numbers. Conjugate and modulus of complex numbers. De Moivre's Theorem.

Unit 3: Equations

Quadratic, cubic and biquadratic equations. Relationship between roots and co-efficient. Symmetric functions of roots.

Unit 4: Inequalities

Solution of linear and quadratic inequalities.

BLOCK 3: Calculus (Without Trigonometry)

Unit 1: Differential Calculus

Concept of limit and continuity; differentiation of the sum, difference, product and quotient of two functions, chain rule. Differentiation of parametric functions. 2nd order derivatives.

Unit 2: Simple Application of Differential Calculus

Rate of change; monotoncity-increasing and decreasing; maxima and minima.

Unit 3: Integration

Integration as an anti-derivative. Integration by substitution and by parts.

Unit 4: Application of Integration

Finding area under a curve. Rectification.

BLOCK 4: Vectors and Three-Dimensional Geometry

Unit 1: Vector-1

Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratio of vectors. Addition of two vectors. Multiplication of a vector by a scalar. Position vector of a point and section formula.

Unit 2: Vector-2

Scalar (Dot) product of vectors, Vector (Cross) product of vectors. Scalar triple product and vector triple product.

Unit 3: Three & Dimensional Geometry-1

Introduction, Distance formula. Direction cosines/ratio of a line passing through two points. Equations of a line in different forms; angle between two lines; Coplanar and skew lines. Distance between skew lines.

Unit 4: Linear Programming

Introduction, definition and related terminology such as constrains, objective function, optimization. Mathematical Formulation of LPP. Graphical method of solving LPP in two variables. Feasible and inferring solution (up to three non-trivial constraints).

5. BCSL-013: Computer Basics and PC Software Lab   **2 Credits**

Objectives:

The main objectives of PC Software Lab course are to familiarize with basic operations of:

i)   Operating systems such as Windows and Linux.
ii)   Word Processor such as Open Office and MSWord.
iii) Workbook, worksheet, graphics and Spreadsheets.
iv)   PowerPoint including animation and sounds.
v)   Address book, Spam and Filtering in E-mail.
vi)   Browsing, Search, Discussion forum and Wiki's.

Section 1   :   Operating System

Session 1   :   Familiarization (Keyboard, Memory, I/O Port),

Session 2   :   Windows (2 Session)

Session 4   :   Linux (2 Session)

Section 2   :   Word Processor (Open Office and MS Word)

Session 1   :   Basic Operations (Font selection, Justification, Spell check, Table, Indentation).

Session 2   :   Table of Contents, Track Changes and Commenting,

Session 3   :   Mail Merge, Printing, Practice session.

Section 3   :   Spread Sheet (Concept of Worksheet, Workbook and Cell)

Session 1   :   Data entry, Data editing and Formula,

Session 2   :   Functioning,

Session.3   :   Graphics and Practice session.

Section 4   :   PowerPoint

Session 1   :   Basics operation,

Session 2   :   Animation and Sounds.

Section 5   :   E-mail

Session 1   :   Basic Operation, Session 2: Address Book, Spam and Filtering.

Section 6   :   Browsing and Discussion Forum

Session1   :   Browsing and Search (2 Sessions),

Session 3   :   Discussion Forum, Wiki and Google Doc (3 Sessions).

4.2   Detailed Syllabus of BCA Second Semester

1. ECO-02: Accountancy-I   **4 Credits**

This course consists of five blocks containing 22 units in all. This course introduces you to the basic accounting concepts and framework. It also covers the preparation of accounts of non-trading and those from incomplete records. After studying this course, you should be able to:

- Understand the whole process of accounting;

- Work out the net result of business operations by preparing final accounts for both trading and non-trading concerns;

- Appropriate special features of accounting fro consignments and joint ventures;

- Describe different methods of providing depreciation, and

- Explain the need for making provisions and various kinds of reserves.

BLOCK 1: Accounting Fundamentals

Unit 1: Basic Concepts of Accounting

Unit 2: The Accounting Process

Unit 3: Cash Book and Bank Reconciliation

Unit 4: Other Subsidiary Books

Unit 5: Bills of Exchange

BLOCK 2: Final Accounts

Unit 6: Concepts Relating to Final Accounts

Unit 7: Final Accounts – I

Unit 8: Final Accounts – II

Unit 9: Errors and their Rectification

BLOCK 3: Consignment and Joint Ventures

Unit 10: Consignments Accounts – I

Unit 11: Consignments Accounts – II

Unit 12: Consignments Accounts – III

Unit 13: Joint Venture Accounts

BLOCK 4: Accounts from Incomplete Records

Unit 14: Self Balancing System

Unit 15: Accounting from Incomplete Records – I

Unit 16: Accounting from Incomplete Records – II

Unit 17: Accounting from Incomplete Records – III

BLOCK 5: Accounts of Non-trading Concerns, Depreciation, Provisions and Reserves

Unit 18: Accounts of Non-trading Concerns – I

Unit 19: Accounts of Non-trading Concerns – II

Unit 20: Depreciation – I

Unit 21: Depreciation – II

Unit 22: Provisions and Reserves

2. MCS - 011: Problem Solving and Programming   3 Credits

Objectives

The course is aimed to develop problem-solving strategies, techniques and skills that can be applied to computers and problems in other areas which give students an introduction to computer and analytical skills to use in their subsequent course work and professional development. Emphasis of this course is to act as an introduction to the thinking world of computers, to help students develop the logic, ability to solve the problems efficiently using C programming. Knowledge in a programming language is prerequisite to the study of most of computer science courses. This knowledge area consists of those skills and concepts that are essential to problem solving and programming practice independent of the underlying paradigm. The student will learn various concepts and techniques for problem solving and will implement those ideas using C programs.

Syllabus

BLOCK 1: An Introduction to C

Unit 1: Problem Solving

Problems Solving Techniques, Steps for Problem – Solving, Using Computer as a Problem-Solving Tool, Design of Algorithms, Definition, Features of Algorithm, Criteria to be followed by an Algorithm, Top Down Design, Analysis of Algorithm Efficiency, Analysis of Algorithm Complexity, Flowcharts, Basic Symbols used in Flowchart Design.

Unit 2: Basics of C

What is a Program and what is a Programming Language? C Language, History of C, Salient Features of C, Structure of a C Program, A Simple C Program, Writing a C Program, Compiling a C Program, Link and Run the C Program, Run the C Program through the Menu, Run from an Executable File, Linker Errors, Logical and Runtime Errors, Diagrammatic Representation of Program, Execution Process.

Unit 3: Variables and Constants

Character Set, Identifiers and Keywords, Rules for Forming Identifiers, Keywords, Data Types and Storage, Data Type Qualifiers, Variables, Declaring Variables, Initialising Variables, Constants, Types of Constants.

Unit 4: Expressions and Operators

Assignment Statements, Arithmetic Operators, Relational Operators, Logical Operators, Comma and Conditional Operators, Type Cast Operator, Size of Operator, C Shorthand, Priority of Operators.

BLOCK 2: Control Statements, Arrays and Functions

Unit 5: Decision and Loop Control Statements

Decision Control Statements, The *if* Statement, The *switch* Statement, Loop Control Statements, The *while* Loop, The *do-while* Statement, The *for* Loop, The Nested Loop, The *Goto* Statement, The *Break* Statement, The *Continue* Statement.

Unit 6: Arrays

Array Declaration, Syntax of Array Declaration, Size Specification , Array Initialization, Initialization of Array Elements in the Declaration, Character Array Initialization, Subscript, Processing the Arrays, Multi-Dimensional Arrays, Multi-Dimensional Array Declaration, Initialization of Two-Dimensional Arrays.

Unit 7: Strings

Declaration and Initialization of Strings, Display of Strings Using Different Formatting Techniques, Array of Strings, Built-in String Functions and Applications, *Strlen Function, Strcpy Function, Strcmp Function, Strcat Function, Strlwr Function, Strrev Function, Strspn Function,* Other String Functions.

Unit 8: Functions

Definition of a Function, Declaration of a Function, Function Prototypes, The Return Statement, Types of Variables and Storage Classes, Automatic Variables, External Variables, Static Variables, Register Variables, Types of Function Invoking, Call by Value, Recursion.

BLOCK 3: Structures, Pointers and File Handling

Unit 9: Structures and Unions

Declaration of Structures, Accessing the Members of a Structure, Initializing Structures, Structures as Function Arguments, Structures and Arrays, Unions, Initializing an Union, Accessing the Members of an Union.

Unit 10: Pointers

Pointers and their Characteristics, Address and Indirection Operators, Pointer Type Declaration and Assignment, Pointer Arithmetic, Passing Pointers to Functions, A Function Returning More than One Value, Function Returning a Pointer, Arrays and Pointers, Array of Pointers, Pointers and Strings.

Unit 11: The C Preprocessor

define to Implement Constants, # *define* to Create Functional Macros, Reading from Other Files using # *include ,*Conditional Selection of Code using *#ifdef,* Using *#ifdef* for different computer types.

Using *#ifdef* to temporarily remove program statements, Other Preprocessor Commands, Predefined Names Defined by Preprocessor, Macros Vs Functions.

Unit 12: Files

File Handling in C Using File Pointers, Open a file using the function fopen (*),* Close a file using the function fclose *( ),* Input and Output using file pointers, Character Input and Output in Files, String Input / Output Functions, Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files, Positioning the File Pointer, the Unbufferred I/O - The UNIX like File Routines.

3. MCS-012: Computer Organisation and Assembly Language Language Programming   4 Credits

Objectives

In the modern era, Computer system is used in most aspects of life. You may use many different types of software on a computer system for particular applications ranging from simple document creation to space data processing. But, how does the Software is executed by the Computer Hardware? The answer to this basic question is contained in this Course. This course presents an overview of the Computer Organisation. After going through this course, you will not only acquire the conceptual framework of Computer Organisation and Architecture but also would be able to use the concepts in the domain of Personal Computers. In specific, you will be able to design digital circuits; describe the functions of various components of computers and their construction; and write simple assembly programs.

Structure

BLOCK 1: Introduction to Digital Circuits

Unit 1: The Basic Computer

The von Neumann Architecture, Instruction Execution: An Example, Instruction Cycle Interrupts, Interrupts and Instruction Cycle, Computers: Then and Now, The Beginning, First Generation Computers, Second Generation Computers, Third Generation Computers, Later Generations.

Unit 2: The Data Representation

Data Representation, Number Systems, Decimal Representation in Computers, Alphanumeric Representation, Data Representation for Computation, Error Detection and Correction Codes.

Unit 3: Principles of Logic Circuits I

Logic Gates, Logic Circuits, Combinational Circuits, Canonical and Standard Forms, Minimization of Gates, Design of Combinational Circuits, Examples of Logic Combinational Circuits, Adders, Decoders, Multiplexer, Encoder, Programmable Logic Array, Read Only Memory ROM.

Unit 4: Principles of Logic Circuits II

Sequential Circuits: The Definition, Flip Flops, Basic Flip-Flops, Excitation Tables, Master Slave Flip Flops, Edge Triggered Flip-flops, Sequential Circuit Design, Examples of Sequential Circuits, Registers, Counters – Asynchronous Counters, Synchronous Counters, RAM, Design of a Sample Counter.

BLOCK 2: Basic Computer Organisation

Unit 1: The Memory System

The Memory Hierarchy, RAM, ROM, DRAM, Flash Memory, Secondary Memory and Characteristics, Hard Disk Drives, Optical Memories, CCDs, Bubble Memories, RAID and its Levels, The Concepts of High Speed Memories, Cache Memory, Cache Organisation, Memory Interleaving, Associative Memory, Virtual Memory, the Memory System of Micro-Computer.

Unit 2: The Input/Output System
Input / Output Devices or External or Peripheral Devices, The Input Output Interface, the Device Controllers and its Structure, Device Drivers, Input Output Techniques, Programmed Input /Output, Interrupt-Driven Input /Output, Interrupt-Processing, DMA (Direct Memory Access). Input Output Processors, External Communication Interfaces.

Unit 3: Secondary Storage Techniques
Secondary Storage Systems , Hard Drives & Its Characteristics, Partitioning & Formatting: FAT, Inode, Drive Cache , Hard Drive Interface: IDE, SCSI, EIDE, Ultra DMA & ATA/66, Removable Drives, Floppy Drives, CD-ROM & DVD-ROM, Removable Storage Options, Zip, Jaz & Other Cartridge Drives, Recordable CDs & DVDs, CD-R vs CD-RW, Tape Backup.

Unit 4: I/O Technology

Keyboard, Mouse , Video Cards, Monitors, Liquid Crystal Displays (LCD), Digital Camera, Sound Cards, Printers , Classification of Printers, Modems, Scanners, Scanning Tips, Power Supply, SMPS (Switched Mode Power Supply).

BLOCK 3: The Central Processing Unit

Unit 1: Instruction Set Architecture

Instruction Set Characteristics, Instruction Set Design Considerations, Operand Data Types, Types of Instructions, Number of Addresses in an Instruction, Addressing Schemes, Types of Addressing Schemes, Immediate Addressing, Direct Addressing, Indirect Addressing, Register Addressing, Register Indirect Addressing, Indexed Addressing Scheme, Base Register Addressing, Relative Addressing Scheme, Stack Addressing, Instruction Set and Format Design Issues, Instruction Length, Allocation of Bits Among Opcode and Operand, Variable Length of Instructions, Example of Instruction Format.

Unit 2: Registers, Micro-Operations and Instruction Execution

Basic CPU Structure, Register Organization, Programmer Visible Registers, Status and Control Registers, General Registers in a Processor, Micro-operation Concepts, Register Transfer Micro-operations, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Instruction Execution and Micro-operations, Instruction Pipelining.

Unit 3: ALU Organisation

ALU Organisation, A Simple ALU Organization, A Sample ALU Design, Arithmetic Processors.

Unit 4: The Control Unit

The Control Unit, The Hardwired Control, Wilkes Control, The Micro-Programmed Control, The Micro-Instructions, Types of Micro-Instructions, Control Memory Organisation, Micro-Instruction Formats, The Execution of Micro-Program.

Unit 5: Reduced Instruction Set Computer Architecture

Introduction to RISC, RISC Architecture, The Use of Large Register File, Comments on RISC, RISC Pipelining.

BLOCK 4: Assembly Language Programming

Unit 1: Microprocessor Architecture

Microcomputer Architecture, Structure of 8086 CPU, Register Set of 8086, Instruction Set of 8086, Data Transfer Instructions, Arithmetic Instructions, Bit Manipulation Instructions, Program Execution Transfer Instructions, String Instructions, Processor Control Instructions, Addressing Modes, Register Addressing Mode, Immediate Addressing Mode, Direct Addressing Mode, Indirect Addressing Mode.

Unit 2: Introduction to Assembly Language Programming

The Need and Use of the Assembly Language, Assembly Program Execution, An Assembly Program and its Components, The Program Annotation, Directives, Input Output in Assembly Program, Interrupts, DOS Function Calls (Using INT 21H), The Types of Assembly Programs, COM Programs, EXE Programs, How to Write Good Assembly Programs.

Unit 3: Assembly Language Programming (Part – I)

Simple Assembly Programs, Data Transfer, Simple Arithmetic Application, Application Using Shift Operations, Larger of the Two Numbers, Programming With Loops and Comparisons, Simple Program Loops, Find the Largest and the Smallest Array Values, Character Coded Data, Code Conversion, Programming for Arithmetic and String Operations, String Processing, Some More Arithmetic Problems.

Unit 4: Assembly Language Programming (Part – II)

Use of Arrays in Assembly, Modular Programming, The stack, FAR and NEAR Procedures, Parameter Passing in Procedures, External Procedures, Interfacing Assembly Language Routines to High Level Language, Programs, Simple Interfacing, Interfacing Subroutines With Parameter Passing, Interrupts, Device Drivers in Assembly.

4. MCS-013: Discrete Mathematics   2 Credits

Objectives

Discrete mathematics, sometimes called finite mathematics, is the study of mathematical structure that are fundamentally discrete, in the sense of not supporting notion of continuity. A study of discrete sets has become more and more necessary because of many application of Computer Science and various areas of engineering. Regarding computer science concept from discrete mathematics are useful to study or express objects or problems in computer algorithm and programming languages. For instance, to improve the efficiency of a computer programs, we need to study its logical structure, which involves a finite number of steps each requiring a certain amount of time. Using the theory of combinatory and graph theory, major areas of discrete mathematics, we can do this. Therefore, a study of these areas would complement and improve the understanding of courses based on algorithm and problem solving.

This course is designed to give basic concepts of propositions, predicates, Boolean algebra, logic circuit, sets, relations, functions, combinatorics, partitions and distributions.

BLOCK 1: Elementary Logic

Unit 1: Prepositional Calculus

Propositions, Logical Connectives, Disjunction, Conjunction, Negation, Conditional Connectives, Precedence Rule, Logical Equivalence, Logical Quantifiers.

Unit 2: Methods of Proof

What is a Proof? Different Methods of Proof, Direct Proof, Indirect Proofs, Counter Examples, Principle of Induction.

Unit 3: Boolean Algebra and Circuits

Boolean Algebras, Logic Circuits, Boolean Functions.

BLOCK 2: Basic Combinatorics

Unit 1: Sets, Relations and Functions

Introducing Sets, Operations on Sets, Basic Operations, Properties Common to Logic and Sets Relations, Cartesian Product, Relations and their types, Properties of Relations, Functions, Functions, Operations on Functions.

Unit 2: Combinatorics – An Introduction

Multiplication and Addition Principles, Permutations, Permutations of Objects not Necessarily Distinct, Circular Permutations, Combinations, Binomial Coefficients, Combinatorial Probability.

Unit 3: Some More Counting Principles

Pigeonhole Principle, Inclusion-Exclusion Principle, Applications of Inclusion – Exclusion, Application to Surjective Functions, Application to Probability, Application to Derangements.

Unit 4: Partitions and Distributions

Integer Partitions, Distributions, Distinguishable Objects into Distinguishable Containers, Distinguishable Objects into Indistinguishable Containers, Indistinguishable Objects into Distinguishable Containers, Indistinguishable Objects into Indistinguishable Containers.

5. MCS-015: Communication Skills   2 Credits

Objectives

This course is aimed to develop the communication skills at the work place. In this course, we concentrate on English at the workplace. You are probably wondering whether business English (as it is also called) is a separate language to general English. Certainly not, business English is not a separate language. It is English used at the workplace using specific vocabulary, and in certain situations having a different discourse. Every profession uses a certain 'jargon' and the business context in no different. While Business English is firmly rooted in general English, nevertheless there are certain distinguishing features which are evident. In this course, you will learn some theoretical inputs into the process of communication, its different types, the difference between written and oral communication. We then concentrate on the structure of conversation – its characteristics and conventions, effectively speaking over the telephone, preparing Curriculum vitae for jobs and interviews, preparing and participating in the Group Discussions, presentation skills, making negotiations and many more.

Syllabus

BLOCK 1: Skills Needed at the Work Place-I

Unit 1: The Process of Communication

Introduction: What is Communication? The Process of Communication, Barriers to Communication, Different Types of Communication, Written vs. Oral Communication, Different Types of Face-to-Face Interactions, Characteristics and Conventions of Conversation, Conversational Problems of Second/Foreign Language Users, Difference between Conversation and Other Speech Events.

Unit 2: Telephone Techniques

Warm Up, Speaking and Listening: Commonly Used Phrases in Telephone Conversations, Reading: Conference Calls, Vocabulary, Writing and Listening: Leaving a Message, Grammar and Usage: The Perfect Tenses, Pronunciation: Contracted Forms.

Unit 3: Job Applications and Interviews

Warm up, Reading, Vocabulary: Apply for a Job, Curriculum Vitae, Language Focus: Some Useful Words, Study Skills: Preparing for an Interview, Listening, Speaking, Writing.

Unit 4: Group Discussions

Reading, Writing Skills, Listening: How to be Successful in a Group Discussion, Study Skills, Language Focus, Vocabulary, Speaking, Grammar: Connectives, Pronunciation.

Unit 5: Managing Organisational Structure

Warm Up: Ability to Influence and Lead, Reading: The Role of a Manager, Vocabulary: Leadership, Speaking and Listening, Language Focus: Degree of Probability, Grammar: Modals, Writing: Reports, Pronunciation.

Unit 6: Meetings

Reading: A Successful Meeting, Speaking: One to One Meetings, Language Focus: Opening, Middle and Close, Study Skills: Editing, Listening: Criteria for Successful Meetings, Vocabulary, Grammar: Reporting Verbs, Writing: Memos, Pronunciation: Stress According to Part of Speech.

Unit 7: Taking Notes and Preparing Minutes

Taking Notes, The Note-taking Skill: The Essential Components, The Note-taking Skill: An Example Preparing Minutes, Format of Minutes, Language and Style of Minutes, Grammar: Using the Passive Voice.

Unit 8: Presentation Skills-I

Reading: Presentation Skills, Grammar: Verbs often required in Presentations, Language Focus, Listening: Importance of Body Language in Presentations, Speaking: Preparing an Outline of a Presentation, Pronunciation.

Unit 9: Presentation Skills-II

Reading: Structure of Presentation, Study Skills: Visual Aids, Ending the Presentation. Language Focus: Talking about Increase and Decrease, Grammar: Prepositions, Listening: Podium Panic, Speaking, Pronunciation: Emphasizing the Important Words in Context.

Unit 10: Negotiation Skills

Language Focus: Idiomatic Expressions, Study Skills: Process of Negotiations, Grammar: Phrasal Verbs, Listening: Effective Negotiations, Speaking, Writing.

6. BCSL - 021: C Language Programming Lab (Lab Course)   1 Credit

Objectives

This lab course is completely based on MCS-011 .The basic objective of the course is to provide the hands on experience on C Programming and improve the practical skill set. Also to apply all the concepts that has been covered in the theory course MCS-011. The learner will try to apply the alternate ways to provide the solution to a given problem. The learner will be able to develop the logic for the given problem, recognize and understand the syntax and construction of C code, gains experience of C , know the steps involved in compiling, linking and debugging C code, feel more confident about writing the C functions, write some complex programs.

Syllabus

Section 1   : C Programming Lab

- Salient Features of C
- C Programming Using Borland Compiler

- Using C with UNIX

- Running C Programs using MS Visual C++

- Program Development Life Cycle

- List of Lab Assignments – Session wise

7. BCSL - 022: Assembly Language Programming Lab (Lab Course)   1 Credit

Objectives

This lab course is completely based on MCS-012.The basic objective of the course is to provide the hands on experience on Assembly language programming and improve the practical skill set. Also to apply all the concepts that have been covered in the theory course MCS-012. The learner will try to apply the alternate ways to provide the solution to a given problem. The learner will be able to develop the logic for the given problem, recognize and understand the syntax and construction of Assembly language code, gains experience of Assembly language programming, know the steps involved in compiling, linking and debugging Assembly language Program.

Syllabus

Section 1: Digital Logic Circuits
- Logic Gates Circuit Simulation Program
- Making a Logic Circuit Using Logic
- A Revisit of Steps of Logic Circuit Design
- Session-wise problem

Section 2   Assembly Language   Programming

- Assemblers
  - ❖ Turbo Assembler (TASM)
  - ❖ MASM
  - ❖ Emu 8086
  - ❖ The DEBUG Program

- Assembly Programming File

- Session-wise List of Programs

4.3   Detailed Syllabus of BCA 3rd Semester

1. MCS-014 : Systems Analysis and Design   3 Credits

Objectives

The objectives of the course include the enabling of learner to identify the Software projects in an organization after studying various functionalities in the organization. Also, they should be able to structure various requirements, do the design and select the best method to develop the system. They should be able to implement and maintain the system. The learners should also get acquainted with different quality standards as well as learn about Management Information Systems.

Syllabus

BLOCK 1: Introduction to Systems Development

Unit 1: Introduction to SAD

Fundamentals of System, Important Terms related to Systems, Classification of Systems, Real Life Business Subsystems, Real Time Systems, Distributed Systems, Development of a successful System, Various Approaches for development of Information Systems. Structured Analysis and Design Approach, Prototype, Joint Application Development.

Unit 2: Systems Analyst-A Profession

Why do Businesses need Systems Analysts? Users, Analysts in various functional areas, Systems Analyst in Traditional Business, Systems Analyst in Modern Business, Role of a Systems Analyst Duties of a Systems Analyst, Qualifications of a Systems Analyst, Analytical Skills, Technical Skills, Management Skills, Interpersonal Skills.

Unit 3: Process of System Development

Systems Development Life Cycle, Phases of SDLC, Project Identification and Selection, Project Initiation and planning, Analysis, Logical Design, Physical Design, Implementation, Maintenance, Product of SDLC Phases, Approaches to Development, Prototyping, Joint Application Design, Participatory Design, Case Study.

Unit 4: Introduction to Documentation of Systems

Concepts and process of Documentation, Types of Documentation, System Requirements Specification, System Design Specification, Test Design Document, User Manual, Different Standard for Documentation, Documentation and Quality of Software, Good Practices for Documentation.

BLOCK 2: Planning and Designing Systems

Unit 5: Process of System Planning

Fact finding Techniques, Interviews, Group Discussion, Site Visits, Presentations, Questionnaires, Issues involved in Feasibility Study, Technical Feasibility, Operational Feasibility, Economic Feasibility, Legal Feasibility, Cost Benefit Analysis, Preparing Schedule, Gathering Requirements of System, Joint Application Development, Prototyping.

Unit 6: Modular and Structured Design

Design Principles, Top Down Design, Bottom Up Design, Structure Charts, Modularity, Goals of Design, Coupling, Cohesion.

Unit 7: System Design and Modelling

Logical and Physical Design, Process Modeling, Data Flow Diagrams, Data Modeling, E-R Diagrams, Process Specification Tools, Decision Tables, Decision Trees, Notation Structured English, Data Dictionary.

BLOCK 3: More Design Issues and CASE Tools

Unit 8: Forms and Reports Design

Forms, Importance of Forms, Reports, Importance of Reports, Differences between Forms and Reports, Process of Designing Forms and Reports, Deliverables and Outcomes, Design Specifications, Narrative Overviews, Sample Design, Testing and Usability Assessment, Types of Information, Internal Information, External Information, Turnaround Document, General Formatting Guidelines, Meaningful Titles, Meaningful Information, Balanced Layout, Easy Navigation, Guidelines for Displaying Contents, Highlight Information, Using Colour, Displaying Text, Designing Tables and Lists, Criteria for Form Design, Organization, Consistency, Completeness, Flexible Entry, Economy, Criteria for Report Design, Relevance, Accuracy, Clarity, Timeliness, Cost.

Unit 9: Physical File Design and Database Design

Introduction to Database design, Flat files vs. Database, Steps in Database Design, E-R model to Database Design, Inputs to Physical Database Design, Guidelines for Database Design, Design of Data Base Fields, Types of Fields, Rules for Naming Tables and Fields, Design of Physical Records, Design of Physical Files, Types of Files, File Organization, Design of Database, Case Study.

Unit 10: CASE Tools for Systems Development

Use of CASE tools by organizations, Definition of CASE Tools, Use of CASE tools by Organizations, Role of CASE Tools, Advantages of CASE Tools, Disadvantages of CASE Tools, Components of CASE, Types of CASE Tools, Classification of CASE Tools, Reverse and Forward Engineering, Visual and Emerging CASE tools, Traditional systems development and CASE based systems development, CASE environment, Emerging CASE Tools, Objected oriented CASE tools, Creating documentation and reports using CASE tools, Creating and executable prototype using Object Oriented CASE tools, Sequence Diagrams.

BLOCK 4: Implementation and Security of Systems & MIS

Unit 11: Implementation and Maintenance of Systems

Implementation of Systems, Conducting System Tests, Preparing Conversion Plan, Installing Databases, Training the end users, Preparation of User Manual, Converting to the new System, Maintenance of Systems, Different Maintenance activities, Issues involved in Maintenance.

Unit 12: Audit and Security of Computer Systems

Definition of Audit, Objectives of Audit, Responsibility and Authority of the System Auditor, Confidentiality, Audit Planning, Audit of Transactions on Computer, Transaction Audit, Audit of Computer Security, Audit of Application, Benefits of Audit, Computer Assisted Audit Techniques, Audit Software, Test Data, Audit Expert Systems, Audit Trail, Computer System and Security issues, Analysis of Threats and Risks, Recovering from Disasters, Planning the contingencies, Viruses, Concurrent Audit Techniques, Need for Concurrent Audit, Techniques, An Integrated Test Facility, Techniques, The Snapshot Techniques, SCARF, Continuous and Intermittent, Simulation Technique.

Unit 13: Management Information Systems

Role of MIS in an organization, Different kinds of Information Systems, Transaction Processing System, Management Information System, Decision Support System, Expert System.

2. MCS-021: Data and File Structures   4 Credits

Objectives

The learner should be well versed with the fundamentals of Algorithms, learn various data structures, should be able to use them appropriately as per need during development of programs. Also, the learner should know different sorting and searching techniques so that correct techniques can be used in different programs so that the complexity of the program does not increase due the sorting/ search technique employed. The learner should have the knowledge about file structures and finally, s/he should also know the concepts of advanced data structures.

Syllabus

BLOCK 1 : Introduction to Algorithms and Data Structures

Unit 1: Analysis of Algorithms

Mathematical Background, Process of Analysis, Calculation of Storage Complexity, Calculation of Run Time Complexity.

Unit 2: Arrays

Arrays and Pointers, Sparse Matrices, Polynomials, Representation of Arrays, Row Major Representation, Column Major Representation, Applications.

Unit 3: Lists

Abstract Data Type-List, Array Implementation of Lists, Linked Lists-Implementation, Doubly Linked Lists-Implementation, Circularly Linked Lists-Implementation, Applications.

BLOCK-2: Stacks, Queues and Trees

Unit 4: Stacks

Abstract Data Type-Stack, Implementation of Stack, Implementation of Stack using Arrays, Implementation of Stack using Linked Lists, Algorithmic Implementation of Multiple Stacks, Applications.

Unit 5: Queues

Abstract Data Type-Queue, Implementation of Queue, Array Implementation, Linked List Implementation, Implementation of Multiple Queues, Implementation of Circular Queues, Array Implementation, Linked List Implementation of a circular queue, Implementation of DEQUEUE, Array Implementation of a *dequeue,* Linked List Implementation of *a dequeue.*

Unit 6: Trees

Abstract Data Type-Tree, Implementation of Tree, Tree Traversals, Binary Trees, Implementation of Binary Tree, Binary Tree Traversals, Recursive Implementation of Binary Tree Traversals, Non Recursive Implementations of Binary Tree Traversals, Applications.

BLOCK 3 : Graph Algorithms and Searching Techniques

Unit 7: Advanced Trees

Binary Search Trees, Traversing a Binary Search Trees, Insertion of a node into a Binary Search Tree, Deletion of a node from a Binary Search Tree, AVL Trees, Insertion of a node into an AVL Tree, Deletion of a node from and AVL Tree, AVL tree rotations, Applications of AVL Trees, B-Trees, Operations on B-Trees , Applications of B-Trees.

Unit 8: Graphs

Definitions, Shortest Path Algorithms, Dijkstra's Algorithm, Graphs with Negative Edge costs, Acyclic Graphs, All Pairs Shortest Paths Algorithm, Minimum cost Spanning Trees, Kruskal's Algorithm, Prims's Algorithm, Applications, Breadth First Search , Depth First Search, Finding Strongly Connected Components.

Unit 9: Searching

Linear Search, Binary Search, Applications.

BLOCK 4 : File Structures and Advanced Data Structures

Unit 10: Sorting

Internal Sorting, Insertion Sort, Bubble Sort, Quick Sort, 2-way Merge Sot, Heap Sort, Sorting on Several Keys.

Unit 11: Advanced Data Structures

Splay Trees, Splaying steps, Splaying Algorithm, Red-Black trees, Properties of a Red Black tree, Insertion into a Red-Black tree, Deletion from a Red-Black tree, AA-Trees.

Unit 12: File Structures

Terminology, File Organisation, Sequential Files, Structure, Operations, Disadvantages, Areas of use, Direct File Organisation, Indexed Sequential File Organisation.

3. MCS 023: Introduction to Database Management Systems   3 Credits

Objectives

Database systems are pervasive. They are present in every segment of commercial, academic and virtual world. They are required as the backbone of any information system, enterprise resource planning, research activities and other activity that require permanence of data storage. This course provides the basic introduction to database system technologies; and concurrency, security and recovery issues of database management systems.

This course also provides the basic conceptual background necessary to design and develop simple database systems. The major focus in this course is the Relational database model; however, it also discusses about the ER model and distributed databases. This course enables you to write good queries using a standard query language called SQL.

Syllabus

BLOCK 1 : The Database Management System Concepts

Unit 1: The Basic Concepts

Need for a Database Management System, The file based system, Limitations of file based system, The Database Approach, The Logical DBMS Architecture, Three level architecture of DBMS or logical DBMS architecture, Mappings between levels and data independence, The need for three level architecture, Physical DBMS Architecture, DML Precompiler, DDL Compiler, File Manager, Database Manager, Query Processor, Database Administrator, Data files indices and Data Dictionary, Commercial Database Architecture, Data Models.

Unit 2: Relational and ER Models

The Relational Model, Domains, Attributes, Tuple and Relation, Super keys Candidate keys and Primary keys for the Relations, Relational Constraints, Domain Constraint, Key Constraint, Integrity Constraint, Update Operations and Dealing with Constraint Violations, Relational Algebra, Basic Set Operation, Cartesian Product, Relational Operations, Entity Relationship (ER) Model, Entities, Attributes, Relationships, More about Entities and Relationships, Defining Relationship for College Database, E-R Diagram, Conversion of E-R Diagram to Relational Database.

Unit 3: Database Integrity and Normalisation

Relational Database Integrity, The Keys, Referential Integrity, Entity Integrity, Redundancy and Associated Problems, Single-Valued Dependencies, Single-Valued Normalisation, The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce Codd Normal Form, Desirable Properties of Decomposition, Attribute Preservation, Lossless-join Decomposition, Dependency Preservation, Lack of redundancy, Rules of Data Normalisation, Eliminate Repeating Groups, Eliminate Redundant Data, Eliminate Columns Not Dependent on Key.

Unit 4: File Organisation in DBMS

Physical Database Design Issues, Storage of Database on Hard Disks, File Organisation and Its Types, Heap files (Unordered files), Sequential File Organisation, Indexed (Indexed Sequential) File Organisation, Hashed File Organisation, Types of Indexes, Index and Tree Structure, Multi-key File Organisation, Need for Multiple Access Paths, Multi-list File Organisation, Inverted File Organisation, Importance of File Organisation in Databases..

BLOCK 2: Structured Query Language and Transaction Management

Unit 1: The Structures Query Language

What is SQL? Data Definition Language, Data Manipulation Language, Data Control, Database Objects: Views, Sequences, Indexes and Synonyms, Table Handling, Nested Queries.

Unit 2: Transactions and Concurrency Management

The Transactions, The Concurrent Transactions, The Locking Protocol, Serialisable Schedules, Locks. Two Phase Locking (2PL), Deadlock and its Prevention, Optimistic Concurrency Control.

Unit 3: Database Recovery and Security

What is Recovery? Kinds of failures, Failure controlling methods, Database errors, Recovery Techniques, Security & Integrity, Relationship between Security and Integrity, Difference between Operating System and Database Security, Authorization.

Unit 4: Distributed and Client Server Databases

Need for Distributed Database Systems, Structure of Distributed Database, Advantages and Disadvantages of DDBMS, Advantages of Data Distribution, Disadvantages of Data Distribution, Design of Distributed Databases, Data Replication, Data Fragmentation, Client Server Databases, Emergence of Client Server Architecture, Need for Client Server Computing, Structure of Client Server Systems, Advantages of Client Server Systems.

BLOCK 3: Application Development: Development of a Hospital Management System

Need to Develop the Hospital Management System (An HMS), Creating a Database for HMS, Developing Front End Forms, Reports, Using Queries and Record set.

BLOCK 4: Study Centre Management System: A Case Study

Software Development Process: Analysis, System Designing, Issues relating to Software Development, Testing and Maintenance.

4. BCS-031 : Programming in C++   3 Credits

Objectives:

The object oriented programming paradigm is one of the popular programming paradigms of today. Due to its characteristics object orientation has added new dimensions in the software development process. In this course concept of Object Oriented Programming (OOP) is introduced and for this purpose C++ programming language is being used. C++ a very powerful general purpose programming language, which supports object oriented programming paradigm. This course covers basics of C++ programming language which includes data types, variables, operators, and array and pointers. Also object oriented features such as class and objects, inheritance, polymorphism are covered in this course. Finally exceptions handling, I/O operations and STL are explained.

BLOCK 1: Basics of Object Oriented Programming & C++

Unit 1: Object Oriented Programming

Structured vs. Object Oriented Programming, Object Oriented Programming Concepts, Benefits of Object oriented programming, Object Oriented Languages.

Unit 2: Introduction to C++

Genesis of C++, Structure of a C++ program, Data Types, Operators and Control Structures.

Unit 3: Objects and Classes

Classification, Defining Classes, Encapsulation, Instantiating Objects, Member Functions, Accessibility labels, Static Members.

Unit 4: Constructors and Destructors

>Purpose of Constructors, Default Constructor, Parameterized Constructors, Copy Constructor, Destructor, Memory Management.

BLOCK 2: Inheritance and Polymorphism in C++

Unit 1: Inheritance

>Concept of Reusability, Types of Inheritance, Single and Multiple Inheritance, Multilevel Inheritance.

Unit 2: Operator Overloading

>Function and Operator Overloading, Overloading Unary and Binary Operators.

Unit 3: Polymorphism and Virtual Function

>Abstract Class, Function Overriding, Dynamic Binding, Pure Virtual Functions.

BLOCK 3: Advanced Features of C++

Unit 1: Streams and Files

>Stream Classes, Types of I/O, Formatting Outputs, File Pointers, Buffer.

Unit 2: Templates and STL

>Function and Class Templates, Use of Templates, Standard Template Library.

Unit 3: Exception Handling

>Exceptions in C++ Programs, Try and Catch Expressions, Exceptions with arguments.

Unit 4: Case Study

>A Case Study to implement a real world problem.

5. BCSL-032: C++ Programming Lab   1 Credit

Objectives:

Objective of this course is to provide hands on experience to the learners in C++ programming. Learners will write program in C++ based on concepts learned in C++ programming course. In this course programming to be done for implementation of OO features such as class, objects, inheritance, polymorphism.

Syllabus and Sessions Allocation:

Session1: Basics of C++, data type, I/O, Control Structures etc., **Session 2:** Class and Objects, function calling, **Session 3:** Constructor and Destructor, **Session 4:** Inheritance, **Session 5:** Operator Overloading, **Session 6:** Polymorphism, **Session 7:** Template class and function, **Session 8:** I/O and streaming,**Session9:** Exception Handling, **Session10:** STL.

6. BCSL-033: Data and File Structures Lab   1 Credit

Objectives:

This lab is based on the courses MCS-021. This lab course involves the development of the practical skills in Data structures using C programming, Theoretical aspects were already covered in the respective theory courses.

This course is an attempt to upgrade and enhance your theoretical skills and provide the hands on experience. By the end of these practical sessions of this course, you will be able to write programs using basic data structures such as Arrays etc. as well as advanced data structures such as trees etc.

Syllabus

SECTION 1: Data and File Structures Lab Manual

- Arrays

- Structures

- Linked Lists

- Stacks

- Queues

- Trees

- Advanced Trees

- Graphs

- Searching

- Sorting

7. BCSL-034: DBMS Lab   1 Credit

Objectives: This lab is based on the courses MCS-023,. This lab course involves the development of the practical skills in DBMS using MS-Access , Theoretical aspects were already covered in the respective theory courses. This course is an attempt to upgrade and enhance your theoretical skills and provide the hands on experience. By the end of these practical sessions of this course, you will be able to create databases and use DBMS Tools in the areas of Database applications.

Syllabus

SECTION 1: DBMS Lab

- Introduction to MS-Access

- Database Creation

- Use of DBMS Tools/Client-Server Mode

- Forms and Procedures

4.4   Detailed Syllabus of BCA Forth Semester

1. BCS-040: Statistical Techniques   4 Credits

BLOCK 1: Statistics and Probability

Unit 1: Descriptive Statistics

Collecting Data, Kinds of Data, Frequency Distribution of a Variable, Graphical Representation of Frequency Distribution, Summarisation of Data, Measures of Central Tendency, Measures of Dispersion or Variability.

Unit 2: Probability Concepts

Preliminaries, Trials, Sample Space, Events, Algebra of Events, Probability Concepts, Probability of an Event, Probability of Compound Events, Conditional Probability and Independent Events.

Unit 3: Probability Distributions

Random Variable, Discrete Random Variable, Continuous Random Variable, Binomial Distribution, Poisson Distribution, Uniform Distribution, Normal Distribution.

BLOCK 2: Statistical Inference

Unit 4: Sampling Distributions

Population and Samples, What is a Sampling Distribution, t-distribution, Chi-Square distribution F-distribution.

Unit 5: Estimation

Point Estimation, Criteria For a Good Estimator, Interval Estimation, Confidence Interval for Mean with Known Variance, Confidence Interval for Mean with Known Variance, Confidence Interval for Proportion.

Unit 6: Tests of Significance

Some Basic Concepts, Tests About the Mean, Difference in the Means of Two Populations Test About the Variance.

Unit 7: Applications of Chi-Square in Problems with Categorical Data

Goodness-of-fit, Test of Independence.

BLOCK 3: Applies Statistical Methods

Unit 8: Analysis of Variance: One-Way Classification

Analysis of Variance: Basic Concepts, Source of Variance, One-Way Classification Model for One-Way Classification, Test Procedure, Sums of Squares, Preparation of ANOVA Table, Pairwise Comparisons, Unbalanced Data, Random Effects Model.

Unit 9: Regression Analysis

Simple Linear Regression, Measures of Goodness of Fit, Multiple Linear Regression, Preliminaries, Regression with Two Independent Variables.

Unit 10: Forecasting and Time Series Analysis

Forecasting, Time Series and Their Components, Long-term Trend, Seasonal Variations, Cyclic Variations, Random Variations/Irregular Fluctuations, Forecasting Models, the Additive Model, the Multiplicative Model, Forecasting Long-term Trends, The Methods of Least Squares, the Methods of Moving Averages, Exponential Smoothing.

Unit 11: Statistical Quality Control

Concept of Quality, Nature of Quality Control, Statistical Process Control, Concepts of Variation, Control Charts, Control Charts For Variables, Process Capability Analysis, Control Charts For Attributes, Acceptance Sampling, Sampling Plan Concepts, Single Sampling Plans.

BLOCK 4: Sampling

Unit 12: Simple Random Sampling and Systematic Sampling

Sampling- What and Why? Preliminaries, Simple Random Sampling, Estimation of Population Parameters Systematic Sampling, Linear Systematic Sampling, Circular Systematic Sampling, Advantages and, Limitations of Systematic Sampling.

Unit 13: Stratified Sampling

Stratified Sampling, Preliminaries, Advantages, Estimation of population parameters, Allocation of sample size, Construction of strata, Post-Stratification.

Unit 14: Cluster Sampling and Multistage Sampling

Cluster Sampling, Preliminaries, Estimation of population mean, Efficiency of cluster sampling Multistage sampling, Preliminaries, Estimation of mean in two stage sampling.

Note: There may be some minor changes in the syllabus of BCS-040.

2. MCS-024: Object Oriented Technologies and Java Programming 3 Credits

Objectives:

Today almost every branch of computer science is feeling presence of object- orientation. Object oriented technology is successfully incorporated in various fields of computer science. Since its arrival on the scene in 1995, the Java has been accepted as one of the primary programming language.

This course is designed to give you exposure to basic concepts of object-oriented technology. This course will help in learning to write programs in Java using object-oriented paradigm. Approach in this course is to take Java as a language that is used as a primary tool in many different areas of programming work.

Syllabus

BLOCK 1: Object Oriented Technology and Java

Unit 1: Object Oriented Methodology-1

Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs.

Unit 2: Object Oriented Methodology-2

Classes and Objects, Abstraction and Encapsulation, Inheritance, Method Overriding and Polymorphism.

Unit 3: Java Language Basics

Introduction To Java, Basic Features, Java Virtual Machine Concepts, A Simple Java Program, Primitive Data Type And Variables, Java Keywords, Integer and Floating Point Data Type, Character and Boolean Types, Declaring and Initialization Variables, Java Operators.

Unit 4: Expressions, Statements and Arrays

Expressions, Statements, Control Statements, Selection Statements, Iterative Statements, Jump Statements, Arrays.

BLOCK 2: Object Oriented Concepts and Exceptions Handling

Unit 1: Class and Objects

Class Fundamentals, Creating objects, Assigning object reference variables, Introducing Methods, Static methods, Constructors, Overloading constructors, This Keyword, Using Objects as Parameters, Argument passing, Returning objects, Method Overloading, Garbage Collection, The Finalize ( ) Method.

Unit 2: Inheritance and Polymorphism

Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword.

Unit 3: Packages and Interfaces

Package, Defining Package, CLASSPATH, Package naming, Accessibility of Packages, Using Package Members, Interfaces, Implementing Interfaces, Interface and Abstract Classes, Extends and Implements Together.

Unit 4: Exceptions Handling

Exception, Handling of Exception, Using try-catch, Catching Multiple Exceptions, Using finally clause, Types of Exceptions, Throwing Exceptions, Writing Exception Subclasses.

BLOCK 3: Multithreading, I/O and String Handling

Unit 1: Multithreaded Programming

Multithreading: An Introduction, The Main Thread, Java Thread Model, Thread Priorities, Synchronization in Java, Interthread Communication.

Unit 2: I/O in Java

I/O Basics, Streams and Stream Classes, Byte Stream Classes, Character Stream Classes, The Predefined Streams, Reading from, and Writing to, Console, Reading and Writing Files, The Transient and Volatile Modifiers, Using Instance of Native Methods.

Unit 3: Strings and Characters

Fundamentals of Characters and Strings, The String Class, String Operations, Data Conversion using Value Of ( ) Methods, String Buffer Class and Methods.

Unit 4: Exploring Java I/O

Java I/O Classes and Interfaces, I/O Stream Classes, Input and Output Stream, Input Stream and Output Stream Hierarchy, Text Streams, Stream Tokenizer, Serialization, Buffered Stream, Print Stream, Random Access File.

BLOCK 4: Applets Programming and Advance Java Concepts

Unit 1: Applets

The Applet Class, Applet Architecture, An Applet Skeleton: Initialization and Termination, Handling Events, HTML Applet Tag.

Unit 2: Graphics and User Interfaces

Graphics Contexts and Graphics Objects, Color Control, Fonts, Coordinate System, User Interface Components, Building User Interface with AWT, Swing-based GUI, Layouts and Layout Manager, Container.

Unit 3: Networking Features

Socket Overview, Reserved Parts and Proxy Servers, Internet Addressing: Domain Naming Services (DNS), JAVA and the net: URL, TCP/IP Sockets, Datagrams.

Unit 4: Advance Java

Java Database Connectivity, Establishing A Connection, Transactions with Database, An Overview of RMI Applications, Remote Classes and Interfaces, RMI Architecture, RMI Object Hierarchy, Security, Java Servlets, Servlet Life Cycle, Get and Post Methods, Session Handling, Java Beans.

3. BCS-041: Fundamental of Computer Networks   4 Credits

Objectives:

This course introduces the basics of data communication and networking. Students will develop an understanding of the general principles of data communication and networking as used in networks. It also includes an activity of setting up a small local area network. The goal of this course is that the student will develop an understanding of the structure of network, its elements and how these elements operate and communicate with each other.

BLOCK 1: Concepts of Communication and Networking

Unit 1: Basics of Data Communication

Concept of communication system, Analog and Digital Communication, Data communication modes, Synchronous and asynchronous transmission, Simplex, half-duplex, full duplex communication, Networking Protocols and Standards, Layering, OSI reference model, encapsulation, End-to-end argument. Protocol design issues, Applications.

Unit 2: Modulation and Encoding

Analog Modulation (AM, FM, PM), AM Demodulation (one technique only), Advantages and Disadvantages of each., Analog to Digital (Digitization), Sampling, Quantization, Digital to Analog, Digital Modulation (ASK, FSK, PSK, QPSK).

Unit 3: Multiplexing and Switching

Concept, FDM, TDM, SDM, Multiplexing Applications, Circuit and Packet Switching.

Unit 4: Communication Mediums

Digital data transmission, Serial and Parallel Transmission, Guided and Unguided mediums, Wireless Communication, Coaxial Cables, Twisted Pair Cables, Fiber Optic Cables, Connectors.

BLOCK 2: Networks and Devices

Unit 1: Network Classifications and Topologies

Network Concept, LAN overview, LAN Topologies, LAN access methods, Network Types based on size like PAN, LAN, MAN, WAN, Functional Classification of Networks, Peer to Peer, Client Server. Wide Area Network, WAN Topologies, WAN Access Methods.

Unit 2: OSI and TCP/IP Models

Introduction of OSI Model, Need of such Models, Basic functions of each OSI layer, Introduction to TCP/IP, Comparisons with TCP/IP layers. (At the beginner's level).

Unit 3: Physical and Data link Layer

Error detection and correction, CRC, Framing, Retransmission strategies, Multi-access communication, CSMA/CD, Ethernet, Addressing, ARP and RARP.

Unit 4: Internetworking Devices

Network Interface Cards, Modems, Repeaters, Hubs, Bridges, Switch (L2 and L3 differences) and gateways.

BLOCK 3: Network, Transport and Application Layer

Unit 1: Network layer

Circuit and packet switching, Routing, Congestion control, Routing protocols: distance vector vs link-state routing, DV problems, Network Addressing, Forwarding, Fragmentation, Error Messaging Services.

Unit 2: Transport layer

Addressing and multiplexing, Flow control, congestion control, data transport, Port numbers, service models, Intro to reliability, QoS.

Unit 3: Application Layer

DNS, Remote Logging, File transfer, Network Management, client-server applications, WWW, E-mail, MIME.

Unit 4: Network Applications

Internet Applications like emails, chatting, social networking, Rail Reservations, Information Sharing, e-governance, Online Processing and Collaborations, etc., Mobile Applications.

BLOCK 4: Network Design and Security

Unit 1: Building a Simple Network

Examples of designing the developing small networks, Structure Cabling, Integrating home computers and devices, creating a small Networking.

Unit 2: Introduction to Network Architectures

X.25, Frame relay, Telephone network, ATM network, ISP, IPv4 and IPv6 overview

Unit 3: Introduction to Wireless and Mobile Networks

Introduction to wireless communication systems, modern wireless communication systems and generations, Introduction to cellular mobile systems, CDMA, cellular system design fundamentals.

Unit 4: Network Security

Introduction to computer security, Security services, Authentication and Privacy, Block and Stream Ciphers, Public and Private key Cryptography, Introduction to RSA, MD5 and DES at the beginner's level.

4. BCS-042: Analysis and Design of Algorithms   2 Credits

Objectives:

To learn about properties of algorithm and how to design an algorithm, discuss asymptotic notations, Design and measure time complexity analysis of searching, sorting and Graph traversal algorithms. Make comparison of different type of algorithm likes Linear, Quadratic, Polynomial and Exponential, Describe how greedy approach facilitate solving the problem. Discuss Divide and Conquer approach for solving the problem.

BLOCK 1: Introduction to Algorithm

Unit 1: Basics of an Algorithm

Definition and Example of an algorithm, Characteristics of an algorithm, Steps in Designing of Algorithms, Growth of function, Recurrence, Problem Formulation (Tower of Hanoi), Substitution Method, Iteration Method, Master Method.

Unit 2: Asymptotic Bounds

Asymptotic Notations, Concept of efficiency of analysis of an algorithm Comparative efficiencies of algorithms: Linear, Quadratic, Polynomial and Exponential.

Unit 3: Analysis of simple Algorithms

Euclid's algorithm for GCD, Horner's Rule for polynomial evaluation, Simple Matrix (n x n) Multiplication, Exponent evaluation e.g. a^n, Searching, Linear Search, Sorting, Bubble sort, Insertion Sort, Selection sort.

BLOCK 2: Design Techniques

Unit 1: Greedy Technique

Elements of Greedy strategy, Activity Selection Problem, Continuous Knapsack Problem, Coin changing Problem, More Examples.

Unit 2: Divide and Conquer Approach

General Issues in Divide and Conquer, Binary Search, Merge Sort, Quick Sort, Integer Multiplication, More Examples.

Unit 3: Graph Algorithm

Representation of Graphs, Adjacency Matrix, Adjacency List, Depth First Search and Examples, Breadth First Search and Examples.

5. MCSL-016: Internet Concepts and Web Design (Lab Course)   2 Credits

Objectives:

The main objective of the course is to introduce the whole range of web technologies starting from HTML, DHTML, Java Script, VBScript, and Dreamweaver. It also gives a brief description on Internet. Through the various examples the course will describe how to design specific page, dynamic web page, forms and frames. It also focuses on the practical aspects of these technologies.

Syllabus

BLOCK 1: Scripting Languages

Unit 1: The Internet

Classification of Networks, Networking Models, What is Packet Switching, Accessing the Internet, Internet Protocols, Internet Protocol (IP), Transmission Control Protocol (TCP), Internet Address, Structure of Internet Servers Address, Address Space, How does the Internet work, Intranet & Extranet, Internet Infrastructure, Protocols and Services on Internet, Domain Name System, SMTP and Electronic Mail, Http and World Wide Web, Usenet and Newgroups, FTP, Telnet, Internet Tools, Search Engines, Web Browser.

Unit 2: Introduction to HTML

What is HTML, Basic Tags of HTML, HTML Tag, TITLE Tag, BODY Tag, Formatting of Text, Headers, Formatting Tags, PRE Tag, FONT Tag, Special Characters, Working with Images, META Tag.

Unit 3: Advanced HTML

Links, Anchor tag, Lists, Unordered Lists, Ordered Lists, Definition Lists, Tables, TABLE, TR and TD Tags, Cell Spacing and Cell Padding, Colspan and Rowspan, Frames, 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, Some Special Tags, COLGROUP, THREAD, TBODY, TFOOT, _blank, _self, _parent, _top, IFRAME, LABEL, Attribute for <SELECT>, TEXTAREA.

Unit 4: Introduction to JavaScript

JavaScript Variables and Data Types, Declaring Variables, Data Types, Statements and Operators, Control Structures, Conditional Statements, Loop Statements, Object-Based Programming, Functions, Executing Deferred Scripts, Objects, Message box in JavaScript, Dialog Boxes, Alert Boxes, Confirm Boxes, Prompt Boxes, JavaScript with HTML, Events, Event Handlers, Forms, Forms Array.

Unit 5: VB Script

What is VBScript? Adding VBScript Code to an HTML Page, VB Script Basics, VBScript Data Types, VBScript Variables, VBScript Constants, VBScript Operators, Using Conditional Statements, Looping Through Code, VBScript Procedures, VBScript Coding Conventions, Dictionary Object in VBScript, Methods: VBScript Dictionary Object, VBScript Dictionary Object Properties, Err Object, Methods: VBScript Err Object, Properties: VBScript Err Object.

Unit 6: Dreamweaver

> Using Dreamweaver, Create a Site Home Page, Design a Page in Layout View, Insert Images, Insert Text, Work in Standard View, View the Site Files, Link your Documents.

BLOCK 2: Lab Manual

Section 1: HTML (Hypertext Markup Language)

- Basic of HTML
- How to Create HTML Document
- Steps for Creating a Simple HTML Program

Section 2: Advanced HTML

- Advanced Topics of HTML

Section 3: JavaScript

- Script Basics
- Incorporating JavaScript into a Web Page

Section 4: VBScript

- VBScript Basics
- Incorporating VBScript into HTML Page

Section 5: Dreamweaver

- How to Work in Dreamweaver??
- How to save your file?
- Adding Layers to the Timeline and Giving Motion to the Layer
- Inserting Scripts
- Inserting External Media in the Web Page
- Adding SSI(Server-side include to the Page)
- Adding CSS Style to your Page
- Adding XML Files to your Page
- To Export a Dreamweaver Document as XML File, checking entries, working in frames, windows control, the Java script URL.

6. BCSL-043: Java Programming Lab   1 Credit

Objectives

This lab is based on the course MCS-024. This lab course involves the development of the practical skills in Java Programming. Theoretical aspects were already covered in the respective theory courses. This course is an attempt to upgrade and enhance your theoretical skills and provide the hands on experience in Java programming. By the end of these practical sessions of this course, you will be able to write programs using java programming language.

SECTION 1: Java Programming Lab

- Programming with Java
- PATH and CLASSPATH Setting
- Example Programs
- List of Lab Assignments

7. BCSL-044: Statistical Techniques Lab   1 Credit

This course is based on Statistical Techniques course.

Objectives:

This lab course will provide opportunity to the learners to implement the concepts and techniques learned in Statistical Techniques course in C/C++ Language and/or in MS-Excel.

Session wise coverage:

Session 1   : Frequency distribution, central tendency and dispersion.

Session 2,3, 4: Hypothesis testing, t distribution, chi square distribution of distribution, normal distribution.

Session 5   : Regression and correlation coefficient-univariate, multivariate.

Session 6   : Anova test.

Session 7   : Central charts.

Session 8   : Time series.

Session 9, 10 : Sampling for a problem domain and analyse – Case Study.

8. BCSL-045 : Analysis and Design of Algorithms Lab   1 Credit

This course will cover practical implementations of several algorithms covered in BCS-042 course.

4.5 Detailed Syllabus of BCA Fifth Semester

1. BCS-051: Introduction to Software Engineering   3 Credits

Objectives:

After studying the course, the student should:

a)   Be able to develop SRS as per any of the existing standards;

b)   Know various Function and Object oriented modeling & design techniques;

c)   Know various testing techniques;

d)   Know different Software Development Life Cycle models; and

e)   Know the concepts of Software Project Management.

BLOCK 1 : Development of SRS

    Unit 1: Characteristics of SRS

        Completeness, Unambiguity, Inconsistency, IEEE SRS.

    Unit 2: Function oriented Modeling

        DFD, ERD, Structure Chart, SRS, Data Dictionaries.

    Unit 3: Object Oriented Modeling

        UML Introduction, Use Case Diagrams, Class Diagrams.

BLOCK 2 : Design and Testing

    Unit 1: Function Oriented Design

        Constructing solution to problem, Identifying components and their interaction, Visualizing the solution, Characteristics of a good function oriented design (Coupling, Cohesion etc.).

    Unit 2: Object Oriented Design

        Identification & Specification problem domain static objects, Working out the application logic objects, Identification of necessary utility objects, Methodology of identification of objects, Case Study.

    Unit 3: Testing Techniques

        Different testing techniques with examples.

    Unit 4: Development and Execution of test cases

        Debugging, Testing tools & Environments, Types of test cases and test plans.

BLOCK 3 : Software Engineering Concepts

    Unit 1: Software Development Models

        Program vs Software, Definition of Software Engineering, SDLC models.

    Unit 2: Software Project Management Concepts

        Planning, Execution, Monitoring, Control of Software Projects, Software Metrics, Application of PERT and GANTT charts.

    Unit 3: Software Engineering Fundamentals

        Software Configuration Management, Software Maintenance, Software Quality Assurance.

2. BCS-052: Network Programming and Administration   3 Credits

BLOCK 1 : TCP/IP Protocols

    Unit 1 : Introduction to TCP/IP

        Origin of TCP/IP and Internet, Communication ,Why do we Need the Internet, Need of Protocol on Communication, Problems in Computer Communication, Dealing with Incompatibility, A Brief History of the Internet, Architecture of the Internet,

TCP/IP Layer and Protocols, Network Access Layer, Internet Layer, Need for IP Address, Classes of IP Address, Special Meanings, Who Decides the IP Addresses, Internet Protocol, Address Resolution Protocol (ARP),Reverse Address Resolution Protocol (RARP), Internet Control Message Protocol (ICMP), Transport Layer, Transmission Control Protocol, User Datagram Protocol (UDP), Application Layer, Electronic Mail, Domain Name System (DNS), How does the DNS Server Works? Simple Network Management Protocol (SNMP), Remote Login: TELNET, World Wide Web: HTTP, Networking Example.

Unit 2 : Internet Protocol

Overview of Internet Protocol, IP Header, IP Address, IP Address Classes, Subnet Masks and CIDR Networks (Classless IP Addresses), Internet-Legal Versus Private Addressing, IP Routing, Routing Protocol, Routing Algorithms.

Unit 3 : Transport Layer Protocols

Overview of TCP, Transmission Control Protocol (TCP), TCP Header, TCP Connection Establishment and Termination, TCP Connection Establishment, TCP Connection Termination, User Datagram Protocol (UDP).

Unit 4 : Application Layer Protcols

Domain Name System (DNS), Hierarchical Name Space, Domain Servers, How does DNS Work in Internet, Domain Name Resolution, Messages Used in DNS, Dynamic DNS (DDNS), Electronic Mail, Simple Mail Transfer Protocol (SMTP),Message Transfer Agent, User Agent, Post Office Protocol (POP), Internet Mail Access Protocol (IMAP),Multipurpose Internet Mail Extension (MIME), Telnet , File Transfer Protocol (FTP).

BLOCK 2: Fundamentals of TCP/IP Programming

Unit 1: TCP/IP Programming Concepts

Client Server Communication, Designing Client/Server Programs, Socket Concepts, IP Address and Ports, Byte Ordering, Sketch of Networking Connection, Active and Passive Sockets, Socket Fundamentals, Networking Example.

Unit 2: Socket Interface

Elementary Socket System Calls, Socket System Call, Bind System Call, Connect System Call, Listen System Call, Accept System Call, Elementary Data Transfer Calls, Closing a Socket, TCP and UDP Architectures, Networking Example.

Unit 3: Socket Programming

Advance System call, Data Transfer, Byte Operations and Addressing, Socket Options, Select System Call Raw Socket, Multiple Recipients, Unicasting, Broadcasting, Multicasting, Quality of Service Issues.

BLOCK 3: Network Administration Using Linux

Unit 1: Introduction To Network Administration

Role and responsibilities of Network Administrator, Linux and TCP/IP Internetworking concepts, Using Network Clients, Understanding System Initialization, Use Remote Administration Services and Tools.

Unit 2: Network Administration Activities

Managing software packages and File systems, Managing users, System and kernel management, Basic Troubleshooting.

Unit 3: Network Configuration and Setting

Configuring Networks, Dynamic Host Configuration Protocol, Domain Name System (DNS), Network File System (NFS), Web Server (Prefer Samba Server).

Unit 4: Network Management and Security

Networks and Security, User Security Management, Disk Security Management, Security Configuration and Analysis, Account Policies, Permissions and Restrictions, Configuring Network Settings, Advance Troubleshooting.

3. BCS-053: Web Programming   2 Credits

Objectives:

After going through this course a student should be able to:

● Use XHTML tags to create simple static web pages;

● format a simple Web page using Cascading Style sheets;

● state the concepts applicable to web programming;

● create an interactive and dynamic Web site using JavaScript;

● represent data over the Web using XML;

● appreciate the use of Ajax and Rich Internet Applications, and

● perform server side scripting using Java Server Pages (JSP).

BLOCK 1: Client Side

Unit 1: Web 2.0 and XHTML

What Is Web 2.0? Introduction to Web 2.0 terms: Search, Content Networks, Blogging, Social Networking, Social Media, Rich Internet Applications (RIAs), Web Services, Mashups, Widgets and Gadgets, Introduction to XHTML and WML, Syntactic Differences between HTML and XHTML, Standard XHTML Document Structure, An example of XHTML covering Basic Syntax, Images, Hypertext Links, Lists and Tables, Creation of an XHTML Form, Internal Linking and Meta Elements.

Unit 2: Using Style Sheets

CSS: Inline Styles, Embedded Style Sheets, Linking External Style Sheets, Style Specification Formats Selector Forms, Colour, Property Value Forms, Font Properties, List Properties, Alignment of Text, The Box Model, Background Image ,The <span> and <div> Tags.

Unit 3: Introduction to XML

XML Basics, XML Document Structure, XML Namespaces, Document Type Definitions, XML Schemas, Displaying XML Documents.

Unit 4: Programming with Java Script – DOM and Events

The Document Object Model, Element Access in JavaScript, Traversing and Modifying a DOM Tree, DOM Collections and Styles, Events, Examples of Event Handling from Body, Button, Text Box and Password Elements, Dynamic Documents using JavaScript – element moving, visibility, positioning etc., Example program (s),Introduction and example of AJAX.

Unit 5: Introduction to WAP and WML

WAP and WML Basics, WML formatting and links, WML input, WML tasks, WML timer, WML variables, Example.

BLOCK 2: Server Side

Unit 1: The Server Side Scripting

Server side scripting and its need ,Two-Tier, Three-Tier, N-Tier and Enterprise Architecture, Various Languages/ Technologies for server scripting ,HTTP Methods (such as GET, POST, HEAD, and so on) , Purpose ,Technical characteristics, Method selection, Use of request and response primitives, Web container – Tomcat.

Unit 2: JSP – Basic

Basic JSP Lifecycle, JSP Directives and Elements, Scriptlets, Expressions, Action Elements, Standard Actions, Comments and Template Data, JSP variables, The out Object, Request, response, sessions and application objects.

Unit 3: JSP – Applications

Exceptions and exception handling using JSP, Cookies and sessions, Managing Email using JSP.

Unit 4: JSP Application Development

Example applications using JSP, What is JDBC? Need for JDBC, Database Drivers, Connection using JDBC API, Application development and deployment.

4. BCS-054 : Computer Oriented Numerical Techniques   3 Credits

Introduction and Objectives: In today's world the practical problems are quite complex and it may not be possible to find their analytical solutions. Hence we have to resort to computer oriented numerical methods for solving them. Numerical analysis provides knowledge of various techniques to get mathematical entities involved in solving the problems.

BLOCK 1: Computer Arithmetic and Solution of Linear and Non-linear Equations

Unit 1: Computer Arithmetic

Floating–Point Arithmetic and Errors, Rounding and Chopping of a Number and Associated Errors, Floating Point Representation of Numbers, Truncation errors and Taylor's Series.

Unit 2: Solution of Linear Algebraic Equations

Preliminaries, Direct Methods, Gauss Elimination Method (Basic), Gauss Elimination Method (Row Interchanges: Pivotal condensation),Iterative Methods, Gauss Jacobi Iterative Method, The Gauss-Seidel Iteration Method, Comparison of Direct and Iterative Methods.

Unit 3: Solution of Non-linear Equations

Non Linear Equations, Solution of Non Linear Equations, Successive Substitution Method(Fixed point method), Bisection Method ,Newton-Raphson Method, Regula-falsi Method, Secant Method.

BLOCK 2: Interpolation

Unit 1: Operator

What is Interpolation, Some Operators and their Properties, Interrelation between operators, Applications of operators on some functions.

Unit 2: Interpolation with Equal Intervals

Difference Table, Interpolation Methods, Newton Forward Difference Formula, Newton Backward Difference Formula, Central Difference Formula, Stirling's Formula, Bessle's Formula.

Unit 3: Interpolation with Unequal Intervals

Lagrange's Method, Divided Difference Method, Divided Difference Table, Newton's Divided Difference Method.

BLOCK 3: Differentiation, Integration and Differential Equations

Unit 1: Numerical Differentiation

Differentiation by Forward/Backward Difference Formula, Differentiation by Central Difference Formula.

Unit 2: Numerical Integration

Methodology's of Numerical Integration, Rectangular Rule, Trapezoidal Rule, Simpsons (1/3) Rule.

Unit 3: Ordinary Differential Equation

Initial Value and Boundary Value Problem, Euler's Method, Improved Euler's Method, Runge Kutta (R-K) Methods (of Order 2 and 4).

5. BCS-055: Business Communication   2 Credits

Objectives:

- Making students aware of the importance of social skills in business.

- Preparing them for the job market.

- Sensitizing them to implications of communicating in multi-cultural settings.

- Making students aware of difference between oral & written communication.

- Facilitating understanding & practice of in company and external business correspondence.

- Dealing with requirements of effective reports & proposals.

BLOCK 1: Business Social Skills & the Recruitment Process

Unit 1: Greetings & Introductions

Small talk, Corporate Entertainment.

Unit 2: Company Profiles/Jobs & responsibilities

Business Organisations, Jobs and Responsibilities

Unit 3: Getting Ready for the Job Market and Organising a Portfolio

Preparing a Portfolio.

Unit 4: Responding to Advertisements

Writing a CV/Resume, Covering Letter, Accepting & Declining Job Offers.

BLOCK 2: Interviews

Unit 1: Preparing for Interview

Preparing for Interviews,

Unit 2: Facing Interview

How to face interviews

Unit 3: Phone and Walk-in-Interviews

How to face interviews, Star Structure

Unit 4: Group Discussions

Essential requirements for GD, How are GD different from Conversation and Debates.

BLOCK 3: Business Writing

Unit 1: Features of Written & Oral Communication

Making a choice, In Company Communication: notices, notes, messages, memos, e mails etc.

Unit 2: External Communication

Types of Letters, faxes, emails, Conventions & Practices.

Unit 3: Writing Reports

Types of reports – Informative & analytical, Contents & Structures.

Unit 4: Writing Proposals

Basic Features, Types of proposals.

BLOCK 4: Cross Cultural Communication

Unit 1: Communication Across Cultures

Culture in Business Communication, Cultural Aspects of behavior at meetings in the US, Cultural Profile of India

Unit 2: Business Travel

Preparation for business travel, International travel, do's and don't of business travel, how to avoid travel related problems, travel itineraries, making arrangements

Unit 3: Business Events

What are business events, the importance of business events, planning for business events, vocabulary associated with business events, polite expressions, writing an e-mil to expo organizers

6. BCSL-056: Network Programming and Administration Lab   1 Credit

Section 1: Introduction to UNIX

Overview of Unix,Unix Commands.

Section 2: Introduction to Linux

Overview of Linux,Exploring Desktop,Using the Shell,Understanding users and file systems, Understanding text processing,Managing processes.

Section 3: Network Programming Using C

Introduction to C.

Section 4: Network Programming and Administration Exercises

Lab Sessions.

7. BCSL-057: Web Programming Lab

This lab course is **of 1Credit**, based on course Web programming.

Session wise coverage:

Session 1   : Using Web 2.0 and creating pages using XHTML.

Session 2   : Creating Style Sheets for the web pages created in session.

Session 3   : Creating sample XML document and displaying it.

Session 4   : WML.

Session 5 and 6 :   Using and writing JavaScript in web pages, including events and Ajax.

Session 7, 8   : Using JSP.

Session 9, 10   : Writing simple applications using JSP and JDB and deploying it.

8. BCSL-058: Computer Oriented Numerical Techniques Lab   1 Credit

This course is based on Computer Oriented Numerical Techniques.

Objectives:

This lab course will provide opportunity to the learners to implement the concepts and techniques learned in course Computer Oriented Numerical Techniques in C/C++ Language and/ or in MS-Excel/Any Spread Sheet.

Session wise coverage:

Session 1,2,3   : for Based on problems discussed in Block 1

Session 4,5,6   : for Based on problems discussed in Block 2

Session 7,8,9,10 : for Based on problems discussed in Block 3

4.6 Detailed Syllabus of BCA Sixth Semester

1. BCS-062: E-Commerce   2 Credits

Objectives:

The Objectives of the Course are:

1. To make the student aware about the basics of E-commerce, its processes and some of the services/products supporting these processes.

2. After studying this course, the students shall be able to understand the basic related business processes like B2B, C2B & B2C involved in the area of E-Commerce with an overview of the technical support for the processes.

BLOCK 1: E-Commerce Concept and Models

Unit 1: Introduction to E-Commerce

Definition and scope of E-Commerce and M-Commerce, E-Commerce trade cycle, Electronic Markets, Internet Commerce, Benefits and Impacts of E-Commerce.

Unit 2: Elements of E-Commerce

Various elements, e-visibility, e-shops, Delivery of goods and services, Online payments, After - sales services, Internet E-Commerce security.

Unit 3: EDI and Electronic Payment Systems

Introduction and definition of EDI, EDI layered Architecture, EDI technology and standards, EDI communications and transactions, Benefits and applications of EDI with example, Electronic Payment Systems: credit/debit/smart cards, e-credit accounts, e-money.

Unit 4: Introduction to EC models

Inter-organization and intra-organization E-Commerce, E-Commerce Models: B2B, B2C, C2B, C2C, G2C, C2G.

BLOCK 2: Practices in E-Commerce

Unit 5: E-Business

Introduction to Internet bookshops, Grocery Suppliers, Software Supplies and support, Electronic newspapers, Virtual auctions, Online share dealing, e-diversity.

Unit 6: E-Security and Legal Issues

Security concerns in E-Commerce, Privacy, integrity, authenticity, non-repudiation, confidentiality, SSL, Digital Signatures and fire walls, IT Act 2000,Cyber crimes and cyber laws.

Unit 7: Mobile Commerce and Future of E-Commerce

Introduction to Mobile Commerce, Benefits of Mobile Commerce, Impediments of M-Commerce, M-Commerce framework, Emerging and future trends.

Unit 8: Case Study

2. MCS-022: Operating System Concepts and Networking Management

4 Credits

Objectives:

This course is intended to introduce the concepts, structure, features, trends and design mechanism of Operating system. The Operating System has seen consistent innovations and developments like other fields of computer science. In this course efforts have been to capture these changes. The trend is towards GUI based free, platform independent, secure and network-based operating system. Linux and Windows 2000 have got very wide coverage in the course. Security and network management, a part of modern Operating System design, have also been taken up.

Syllabus

BLOCK 1: Operating System Fundamentals Networking

Unit 1: Graphical User Interface

What is Graphical User Interface, Evolution of Human and Machine Interaction, Common Graphical User Interfaces, Functionality of Graphical User Interface, GUI Design Consideration: psychological factors, GUI Design Consideration: standards, GUI Example, Microsoft Windows, Macintosh Toolbox, X-windows, NeXT.

Unit 2: Introduction to Operating System

What is an Operating System? Evolution of Operating System, Serial Processing, Batch Processing, Multiprogramming, Operating System Structure, Layered Structure Approach, Virtual Machine, Client-Server Model, Kernel Approach, Classification of Advanced Operating System, Architecture Driven Operating System, Application Driven Operating System, Characteristics of Modern Operating System, Microkernel Architecture, Multithreading, Symmetric Multiprocessing.

Unit 3: Introduction to Networking Concepts

Why Computer Networks, The Topologies, Characteristics of the OSI Layers, OSI Models and Communication between Systems, Interaction between OSI Model Layers, Protocols Types of Networks, Local Area Network (LANs), Metropolitan Networks (MANs), Wide Area Network (WANs), Medium, Data Flow,

Physical Connection, Transmission Media, Connecting Devices, Repeaters, Hubs, Bridges, Routers, Gateways.

Unit 4: Internetworking: Concept, Architecture and Protocols

Architecture and Protocols, History of internetworking, Packet Switching, Internetworking Concepts, Internet Addresses Object-Based Programming, Configuring IP Addresses, TCP/ IP, Additional TCP/ IP – Related Protocols, Application Layer Protocols, File Transfer Protocols, Trivial File Transfer Protocol (TFTP), TELNET, Remote login, Electronic Mail (Email),World Wide Web, Domain Name System, SNMP and UDP.

BLOCK 2: Linux Operating System

Unit 1: Introduction to Linux Operating System

Features of Linux, Drawbacks of Linux, Components of Linux, Memory Management Subsystems, Linux Process and Thread Management, File Management System, Device Drivers.

Unit 2: Linux Commands and Utilities

Entering the Machine, User Names and Groups, Logging In, Correcting Typing Mistakes, Format of Linux Commands, Changing Your Password, Characters with Special Meanings, Linux Documentation, The File System, Current Directory, Looking at the Directory Contents, Absolute and Relative Pathnames, Some Linux Directories and Files.

Unit 3: Linux Utilities and Editor

Some Useful Commands, Permission Modes and Standard Files, Pipes, Filters and Redirection, Shell Scripts, Graphical User Interface, Editor.

Unit 4: User-to-User Communication

On-Line Communication, Off-Line Communication, Apache Server Settings, Network Server Settings, Domain Name Server, Network File Server.

Unit 5: UNIX System Administration

System Administration, Installing Linux, Choosing an Installation Method, Choosing an Installation Class, Pre-installation checks, Installation, Booting the System, Maintaining User Accounts, File Systems and Special Files, Backups and Restoration.

BLOCK 3: Windows 2000

Unit 1: Windows 2000 Networking

Windows 2000 Operating System Architecture, Peer-To-Peer Network, Domains, Network Protocols, File Services, Shared Folders, Distributed File System, Print Services, Using the Mapped Drive, Printing a Mapped Drive, Disconnecting a Mapped Drive, Viewing Directory Information, Creating a Shared Folder, Logging off a Client, A Few Important Facts About Windows 2000 Usages.

Unit 2: Managing Windows 2000 Server

Using Windows 2000 and Client, Logging on to the Network, Browsing Network Resources 1, Accessing Network Resources Using My Network Places, Mapping a Folder.

Unit 3: Advanced Windows 2000 Networking

Windows 2000 Domains, Workgroups & Trusted Relationships, Concept of Domains, Trust Relationships, Building Domains, User Administration, Remote Access.

Unit 4: Windows XP Networking

Introduction to Windows XP Networking, TCP/IP Protocol Setting for Windows XP, To Select a Network Protocol, Virtual Private Networks and Remote Networking, Windows XP in File System, Sharing Network Resources in Windows XP, Sharing Files in Windows XP, Sharing Folders in Windows XP, Sharing Drives in Windows XP, Enabling Offline File Features.

BLOCK 4: Security and Management

Unit 1: Security Concepts

Goals of Computer Security, Integrity, Confidentiality, Availability, Security Problem and Requirements, Identifying the Assets, Identifying the Threats, Identifying the Impact, Threat and Vulnerabilities, User Authentication, Security System and Facilities, System Access Control, Password Management, Privileged User Management, User Account Management, Data Resource Protection, Sensitive System Protection, Cryptography, Intrusion detection, Computer-Security Classifications.

Unit 2: Computer Security

Hardening Operating System and Application Code, Hardening File System Security, Hardening Local Security Policies, Hardening Services, Hardening Default Accounts, Hardening Network Activity, Malicious Code, Firewall, Fault Tolerant System, BACKUP and UPS.

Unit 3: Security and Management-I

Main Issues In Windows Security Management, Physical Security Management, Logon Security Management, Users and Groups Management, Managing Local and Global Groups, Managing User Accounts, Windows NT Domain Management, Domain Controller, The Primary Domain Controller (PDM), Backup Domain Controller (BDC), Windows Resources Management, Registry Management, Removing Registry Access, Managing Individual Keys, Audit Registry Access, Printer Management, Managing Windows 2000 Operating System, Active Directory, Logical Structure, Physical Structure, Windows 2000 DNS Management, Managing Group Policy.

Unit 4: Security and Management-II

User Authentication Management, Subsystems Component Management, Kerberos Management, User and Group Management, Configuring User Accounts, Creating Domain User Accounts, Managing Logon Hours, Managing Expiry Date for a User Account, Windows 2000 Groups Management, Default Group Types, Security Configuration Management Tool, Resource Management, Files and Folder Management, Files and Folder Permission, Inheritances and Propagation, Moving Data and Permission, Shared Resources Management, The NULL Session, Registry Management,
Default Registry Configurations, Registry Backup Managements, Printer Security Management, Windows 2000 Network – Security and Management, NAT and ICS,

RRAS, RADIUS and IAS, IPSec, Encrypting File System Management, Encrypting File System (EFS), EFS and Users Management, Data Recovery Management, EFS Cryptography Management.

BCSL-063: Lab (Operating System concepts and Networking Management)

<div align="right">**1 Credit**</div>

Objectives :

This lab is based on the course MCS-022. This lab course involves the development of the practical skills in OS and Networking. Theoretical aspects were already covered in the respective theory courses. This course is an attempt to upgrade and enhance your theoretical skills and provide the hands on experience. By the end of these practical sessions of this course, you will be able use Unix and Linux OS commands, write scripting and Installation and Configuration of the networking services like TCP/IP, DNS, DHCP, FTP, SMTP etc.

Structure

SECTION 1: Operating Systems and Networking Lab

- Overview of Windows 2000
- Unix and Linux
- Advanced concepts of Local Area Network
- Network administration of Windows 2000
- LINUX administration
- Unix Networking
- Installation and Configuration of the networking services like TCP/IP, DNS, DHCP, FTP, SMTP

BCSP-064: Project

<div align="right">**8 Credits**</div>

The objective of the BCA project work is to develop a quality software solution by following the software engineering principles and practices. During the development of the project the students should involve in all the stages of the software development life cycle (SDLC). The main objective of this project course is to provide learners a platform to demonstrate their practical and theoretical skills gained during five semesters of study in BCA Programme. During project development students are expected to define a project problem, do requirements analysis, systems design, software development, apply testing strategies and do documentation with an overall emphasis on the development of a robust, efficient and reliable software systems. The project development process has to be consistent and should follow standard.. For example database tables designed in the system should mach with the E-R Diagram. SRS documents to be created as per IEEE standards.

Students are encouraged to spend maximum time of the sixth semester working on a project preferably in a software industry or any research organization. Topics selected should be complex and large enough to justify as a BCA final semester project. The courses studied by the students during the BCA Programme provide them the comprehensive background knowledge on diverse subject areas in computer science such as computer programming, data structure, DBMS, Computer Organization, SAD, Software Engineering, Computer Networks etc., which will be helping students in doing project work. *Student will receive Project Guidelines along with their 5th semester course material. Students may also download Project Guidelines from IGNOU Website. Students should strictly follow and adhere to the BCSP-064 project guidelines.*

5. EVALUATION SCHEME

Completion of the programme requires successful completion of both assignment component and the Term-end Examination component for each of the courses in the programme. The total numbers of courses in BCA (Revised) are 39 and the total number of credits are 99.

Evaluation for each course covers two aspects:

a) Continuous evaluation through **Assignment with a weightage of 25%** in all courses except ECO-01, ECO-02, FEG-02, and BCSP-064. The Weightage for assignment in ECO-01, ECO-02 and FEG-02 is 30%. There is no assignment component in BCSP-064(Project Course). Wherever marks for viva-voce are mentioned in the assignment of any of the courses, viva-voce is compulsory. **If the student submits assignment and does not attend viva-voce, then the submission of the assignment becomes NULL and VOID. Student will be awarded ZERO marks for the assignment.**

b) **Term-end examination with a weightage of 75%** for all the courses except ECO-01, ECO-02, FEG-02 and BCSP-064. The wightage for term end examination for ECO-01, ECO-02, and FEG-02 is 70%. In the case of BCSP-064, Project Report evaluation is having a weightage of 75% and viva-voce is having a weightage of 25%.

Note: *A learner should not apply for appearing at the term-end examination of any course without getting registered for the same and that if s/he does so, her/his result would be withheld. The result may be cancelled and the onus shall be on the student.*

Assignments

The main objective of assignments is to keep student spend time in studying the course material and other materials such as reference books, related websites etc. Hence, students are advised not to copy the answers for the assignments from the course materials.

Unfair means in attempting the assignments

As per IGNOU Norms, If the learners copy assignments, which is an important component of the ODL system, such assignments will be awarded "zero" and direct such students to re-attempt the fresh assignments pertaining to the next year which will indirectly delay the award of degree by a semester / year.

5.1 Evaluation and Marking Scheme for BCA

Table following table shows the semester-wise courses with their course codes and the credits.

Sem-ester	Course Code	Course Title	Credits
I	* FEG-02	Foundation course in English -2	4
	*ECO-01	Business Organization	4
	BCS-011	Computer Basics and PC Software	3
	BCS-012	Basic Mathematics	4
	BCSL-013	Computer Basics and PC Software Lab	2
II	* ECO-02	Accountancy-1	4
	MCS-011	Problem Solving and Programming	3
	MCS-012	Computer Organization and Assembly Language Programming	4
	MCS-013	Discrete Mathematics	2

	MCS-015	Communication Skills	2
	BCSL-021	C Language Programming Lab	1
	BCSL-022	Assembly Language Programming Lab	1
III	MCS-021	Data and File Structures	4
	MCS-023	Introduction to Database Management Systems	3
	MCS-014	Systems Analysis and Design	3
	BCS-031	Programming in C++	3
	BCSL-032	C++ Programming Lab	1
	BCSL-033	Data and File Structures Lab	1
	BCSL-034	DBMS Lab	1
IV	BCS-040	Statistical Techniques	4
	MCS-024	Object Oriented Technologies and Java Programming	3
	BCS-041	Fundamentals of Computer Networks	4
	BCS-042	Introduction to Algorithm Design	2
	MCSL-016	Internet Concepts and Web Design	2
	BCSL-043	Java Programming Lab	1
	BCSL-044	Statistical Techniques Lab	1
	BCSL-045	Algorithm Design Lab	1
V	BCS-051	Introduction to Software Engineering	3
	BCS-052	Network Programming and Administration	3
	BCS-053	Web Programming	2
	BCS-054	Computer Oriented Numerical Techniques	3
	BCS-055	Business Communication	2
	BCSL-056	Network Programming Lab	1
	BCSL-057	Web Programming Lab	1
	BCSL-058	Computer Oriented Numerical Techniques Lab	1
IV	BCS-062	E-Commerce	2
	MCS-022	Operating System Concepts and Networking Management	4
	BCSL-063	Operating System Concepts and Networking Management Lab	1
	BCSP-064	Project**	8

Note:

i)   No practical examinations in the non-lab courses. Practical examination will be conducted in the lab courses only. The letter 'L' in the course code represents the lab course. Pass in each and every section in the practical course of Term End Practical Examination is compulsory to in order to declare it successful in the respective course.

ii) * For these courses existing rules of the university will be applicable.

iii) **The Project consist of 2 components namely project report evaluation and viva. Viva-voce is compulsory and forms part of evaluation. A student in order to be declared successful in the project must secure 40% marks in each component (i) Project Evaluation and (ii) Viva-voce. Maximum Marks for project report will be 150 and for Viva-Voce Maximum Marks will be 50.To Pass the project course one need to score minimum 60 marks in Project Report and minimum 20 marks in Viva-Voce.

iv) *For FEG-02,ECO-01 and ECO-02 maximum marks and duration will be as per existing rules of the University (for details please see-
     http://www.ignou.ac.in/ignou/aboutignou/school/soms/programmes/detail/191/2).

In order to be able to appear for the Term-end examination, it is a requirement that the student submit all the assignments according to the prescribed schedule. All students will be required to give an undertaking to this effect, and should it be later found that they had in fact not submitted the assignments as prescribed, the results for the Term-end examination will be withheld and may be cancelled.

The following is the evaluation methodology of various courses of BCA (Revised):

In the following methodology, Min. Marks indicate Qualifying Marks/Passing Marks. It is essential to pass in each of the components of the course individually to be declared as successful in the respective course. It is also to inform that, there is no need for students to submit Practical Record in any of the courses of BCA(Revised) expect BCSP-064 in which the student will submit Project Report:

I) Evaluation Methodology of BCS-011, BCS-012, BCS-031, BCS-041, BCS-051, BCS-052 and BCS-054

a) **Continuous Evaluation :** Max. Marks: 100, Min. Marks: 40, Weightage : 25%

b) **Term End Examination :** Max. Marks: 100, Min. Marks 40, Weightage: 75% Duration of TEE: 3 hours

II) Evaluation Methodology of BCS-040

a) **Continuous Evaluation :** Max. Marks: 100, Min. Marks: 35 Weightage : 25%

b) **Term End Examination :** Max. Marks: 50, Min. Marks 17.5, Weightage: 75% Duration of TEE: 2 hours

III) Evaluation Methodology of BCS-042, BCS-053, BCS-055, BCS-062

a) **Continuous Evaluation :** Max. Marks: 100, Min. Marks: 40 Weightage : 25%

b) **Term End Examination :** Max. Marks: 50, Min. Marks 20, Weightage: 75% Duration of TEE: 2 hours

IV) Evaluation Methodology of BCSL-021, BCSL-022, BCSL-032, BCSL-033, CSL-034, BCSL-043, BCSL-044, BCSL-045, BCSL-56, BCSL-057, BCSL-058, BCSL-063

a) **Continuous Evaluation :** Max. Marks: 50, Min. Marks: 20, Weightage: 25%

b) **Term End Practical Examination :** Max. Marks: 50, Min. Marks 20, Weightage: 75% Duration of TEPE: 1 hour

V) Evaluation Methodology of BCSL-013

a) **Continuous Evaluation :** Max. Marks: 100, Min. Marks: 40, Weightage: 25%

b) **Term End Practical Examination :** Max. Marks: 50, Min. Marks 20, Weightage: 75% Duration of TEPE: 2 hour

VI) Evaluation Methodology of MCS-011, 012, 014, 021, 023, 024, 022

a) **Continuous Evaluation :** Max. Marks 100 Min. Marks: 40, Weightage: 25%

b) **Term End Practical Examination :** Max. Marks: 100, Min. Marks 40, Weightage: 75% Duration of TEPE: 3 hour

VII) Evaluation Methodology of MCS-013, MCS-015

a) **Continuous Evaluation :** Max. Marks 100 Min. Marks: 40, Weightage: 25%

b) **Term End Practical Examination :** Max. Marks: 50, Min. Marks 20, Weightage: 75% Duration of TEE: 2 hour

VIII) Evaluation Methodology of MCSL- 016

a) **Continuous Evaluation :** Max. Marks: 100, Min. Marks: 40, Weightage: 25%

b) **Term End Practical Examination :** Max. Marks: 50, Min. Marks 20, Weightage: 75%
Duration of TEE: 2 hour

IX) Evaluation Methodology of ECO-01, ECO-02

a) **Continuous Evaluation :** Max. Marks 100, Min. Marks: 35, Weightage: 30%

b) **Term End Examination :** Max. Marks: 50, Min. Marks: 17.5, Weightage: 70%,
Duration of TEE: 2 hours

X) Evaluation Methodology of FEG-02

a) **Continuous Evaluation :** Max. Marks 100, Min. Marks: 35, Weightage: 30%

b) **Term End Examination :** Max. Marks: 50, Min. Marks: 17.5, Weightage: 70%,
Duration of TEE: 2 hours

XI) Evaluation Methodology of BCSP-064

a) **Project Report Evaluation:** Max. Marks: 150, Min. Marks:60, Weightage: 75%

b) **Project Viva:** Max. Marks: 50, Min. Marks: 20, Weightage: 25%

The total marks secured in a course will be the sum of marks secured in Assignment and Term End Examinations. It is essential to secure minimum marks in each of the components of the course. That is, the student should secure minimum marks in assignment as well as in term end examination to be declared as *successfully completed* the respective course. To pass a course, the student needs to secure at least 40% in each of the components of the course individually except for BCS-040, ECO-01, ECO-02 and FEG-02. The student needs to secure at least 35% in each of the components to pass in ECO-01, ECO-02 and FEG-02. In the case of BCSP-064, the minimum passing marks in each of the project report evaluation and viva-voce are 40%

5.2 Instructions for Assignments

While answering Assignments, the following guidelines are required to be followed:

1.   Tips for assignments

The word limits for answering most of the questions are mentioned with them if no word limit is prescribed, and then assume it to be minimum about 300 words. You will find it useful to keep the following points in mind:

i)   Planning: Read the assignment carefully. Go through the units on which they are based. Make some points regarding each question and rearrange these in logical order.

ii)   Organisation: Be a little more selective and analytical before drawing up a rough outline of your answer. In an essay-type question give adequate attention to your introduction and conclusion. The introduction must offer brief interpretation of the question and how you propose to develop it. The conclusion must summarize your response to the question. Make sure that your answer:
a)   is logical and coherent;
b)   has clear connection between sentences and paragraphs;
c)   is written correctly giving adequate consideration to your expression, style and presentation;
d)   use of figure/ diagram to enhance your answer wherever required;
e)   does not exceed the number of words indicated (if any) in your questions.

iii) Presentation: Once you are satisfied with your answers, you can write down the final version for submission, writing each answer neatly and underlining the points you want to emphasize.

2. The following format is to be followed for submission of the assignment:

   The top of the first page of your response sheet for each assignment should look like this:

   ```
   PROGRAMME TITLE : ......................    ENROLMENT No. : ...........................

   COURSE CODE : ..............................    NAME : ...............................................

   COURSE TITLE : ...............................    ADDRESS: ..........................................

   ASSIGNMENT CODE : ........................    SIGNATURE : ....................................

   STUDY CENTRE : ..............................    DATE : ...............................................
   ```

4. Read instructions for submission of assignments given here. The assignments response sheets should be hand written. However the s/w coding, snapshots, test cases etc. can be in the printed form. **Students should not reproduce their answers from the units sent to them by the University. If they reproduce from the units, they will get poor marks for the respective question**.

5. The students should write each assignment separately. All the assignments should not be written in continuity.

6. **The students should write the question number with each answer. Photocopy of the submitted assignment is to be retained by the student for his or her own record and future reference, if any.**

7. The students should use only A4 size paper for their response and tag all the pages carefully. Avoid using very thin paper. They should allow a 4-cm. margin on the left and at least 4 lines in between each answer. This may facilitate the evaluator to write useful comments on the margins at appropriate places.

8. **The students should not copy the assignments from others. If copying is noticed, the assignments of such students will be rejected, and disciplinary action will be taken against the students as per rules of the University.**

9. **The completed assignment response should be sent to the Coordinator of the Study Centre. Under no circumstances should they be sent to any other department or the School at Headquarters**, for evaluation. After submitting the assignment at the Study Centre in person, the students should get the acknowledgement from the Co-ordinator on the prescribed assignment-cum-acknowledgement card (**Form No. 1**) otherwise, the assignment response should be sent under certificate of posting through post. The students should get back evaluated assignments from their study centres within one month of its submission for the feedback and for their future guidance.

10. In case the student has requested for a change of Study Centre, s/he should submit her/his Assignments only to the original Study Centre until the University effects the change of Study Centre.

5.3   Guidelines for the Submission of Assignments

1.   It is compulsory for the students to submit all the prescribed assignments. They will not be allowed to appear for the term-end examination of a course if they do not submit the specified number of assignments in time for that course.

2.   The assignment responses should be complete in all respects. Before submission, the students should ensure that they have answered all the questions in all assignments. Incomplete answer sheets bring poor grades.

3.   The Co-ordinator of the Study Centre has the right to reject the assignments received after the due date. Therefore, the students are advised to submit their assignments before the due date.

4.   In case of submitting assignment through post, Students should enclose a self-addressed stamped assignment remittance-cum-acknowledgement card with each assignment response to ensure the delivery of assignments before the last dates prescribed for submission of assignments.

5.   In case any student fails to submit the assignments or fails to score minimum qualifying marks, s/he has to wait for fresh assignments meant for the current batch of student, which may be downloaded from IGNOU website.

6.   For their own record, students should retain a photocopy of all the assignment responses, which they submit to the Co-ordinator of their Study Centre. If they do not get back their duly Evaluated Assignment within a month after submission, they should try to get it from their Study Centre personally. This may help them to improve upon future assignments.

7.   **As per the University norms, once the student's scores pass marks in an assignment, they can not re-submit it for improvement of marks.**

8.   Assignments are not subject to re-evaluation except for factual errors, if any. The discrepancy noticed by the students in the evaluated assignments should be brought to the notice of the Co-ordinator of the Study Centre, so that s/he forwards the correct score to the concerned RC or to the Student Evaluation Division at Headquarters.

9.   The students should not enclose or express doubts for clarification, if any, along with the assignments. They should send their doubts in a separate cover to the Registrar, Student Evaluation Division, Indira Gandhi National Open University, Maidan Garhi, New Delhi - 110 068. While doing so they should give their complete Enrolment number, name, address, programme code.

10. In case of not successfully completed or missed; the fresh assignments should be submitted only, if your registration for that course is valid.

11. Please do not submit your assignment responses twice either at the same Study Centre or at different Study Centres for evaluation.

Note : **Please submit your Assignments on or before the due date at your study centre.**

5.4 General Guidelines Regarding the Term-End Examination (it is also available at IGNOU website)

1. The examination form can be submitted online only. The fees and the guidelines are given below:

2. To be eligible to appear the Term-end Examination in any course, the students are required to fulfill the following conditions:

    a) they should have paid the fee due for that semester.

    b) they should have opted and pursued the prescribed course.

    c) they should have submitted the examination form through online with credit/debit/net banking requisite fees.

    d) they should have submitted the required number of assignments within due dates before taking the examination.

    e) their registration for the programme should be valid.

3. The University conducts term-end examinations twice a year, in June and December. The student can take the examination only after the minimum period prescribed for the course of study has elapsed.

4. (i) **Dates for the Submission of Online Term End Examination form**

    24th September 2018 to 31st October 2018   -   Without late fee

    1st November 2018 to 10th November 2018   -   With late fee of Rs.1000/-

    (ii) Prerequisite for the submission of the Term End Examination Form:
        (Please see the updated details at- https://exam.ignou.ac.in/ExamDec18_Test/)

    (iii) **Examination fee and Mode of Payment**

    (Note: Students may select any one of the HDFC or IDBI Bank option to make payment from any of their credit/debit card of any bank)

Examination Fee	Payment Mode
@ 150 per course theory @ 150 per course practical	Credit Card / Debit Card /Net Banking

    In case, examination fee needs to be returned to student due to technical reasons, the fee will be refunded to the same account (Credit card/ Debit card/ Net Banking) from which the payment was made.

    Students are advised that they must ensure they are exercising adequate caution and care while filling the form and opting mode of payment.

    (iv) **Un-successful Submission of Exam Form**
        Step 1: Payment deducted through Credit Card / Debit Card /Net Banking. however the student is not able to get acknowledgement successfully in the first stage. In such cases it is advised that the student may wait for 72 hours for checking the Examination Form status submitted by him/her through SEARCH OPTION.
        Step 2: Re-submit the Examination Form after following the advice given above (Step1).
        Step 3: Students can apply separately after the publication of Hall Ticket on IGNOU website for the refund of Examination Fee, if not refunded automatically by the Payment Gateway within 72 hours.

(v) **Related to Refund excess Examination Fee**

a. Students who fill Exam Form online through Cyber Café/ Other Agency, must ensure receipt of the Examination Fee and that their Fee is reached IGNOU through SEARCH Option at IGNOU website

b. Students are required to submit chargeback case(s) in bank only after the publication of Hall Ticket on IGNOU website.

c. If a student gets back refund of all the Examination Fee through Chargeback process and still appeared in Examination, his/her Exam result will be withheld and will be released after paying the requisite Examination Fee.

(vi) **Hall Ticket for Term End Examination**

- Hall Ticket will be uploaded on the University Website well before 7 to 8 days before the commencement of the Term-end examinations. Please take print out of Hall Ticket from University website (www.ignou.ac.in) and report at the Examination Centre along with the Identity Card issued by the Regional Centre/University.

- Students will be allowed to appear in Term-end Examination for the course(s) for which registration is valid and not time-barred and assignment(s) is/are submitted. Examination Fee once submitted will not be refunded.

- Students must carry IGNOU Identity-Card in the Examination Hall for writing Examination. In case, students do not have IGNOU Identity card due to various reasons, they must get it issued (i.e. duplicate copy of IGNOU Identity card) from Regional Centre concerned well before the start of the Examination. Students are required to contact the RC in person (by post) and get the duplicate Identity card for attending Examination.

(vii) **Contact Details**

In case of non-receipt of Control number or any query pertaining to Examination Form please contact or send us email at termendexam@ignou.ac.in

Please visit IGNOU website for updated information related to Term End Examination

5.5 Guidelines and instructions for submission of online examination form at IGNOU website.

i) Students are required to pay examination **fee for each course** if the student is appearing for the first time or failed earlier examinations for theory as well as practical. Payment can be made through Credit Card, & Net banking through or online mode. Please choose the suitable option for payment. For details of fee, please refer to examination form.

ii) The examination form must submitted through online mode at IGNOU website www.ignou.ac.in

iii) Select and enter Programme code and Examination Centre Code from the options available. If the centre opted by the student is not activated as examination centre or not allotted for any other reason, alternative examination centre will be allotted.

iv) Select courses carefully. Courses for theory as well as practical needs to be selected separately from the list appearing on the screen.

v) You have to submit on-line form and make payment through Credit Card & Net banking please note the auto generated control No. for reference.

vi) You have to submit on-line form and deposit payment by credit/debit/ or net banking through online mode, please fill on-line examination form and submit after selecting this option. You are required to take printout of automatically generated control number. **You need not send anything by post.**

vii) You will receive any acknowledgement as control number, after submitting your form online.

viii) You may visit SEARCH OPTION after 72 hours of submission of your form (leaving the day of submission except Saturday & Sunday) to see the details of particulars submitted by you. In case you find the particulars are not available, you may submit the form again.

ix) University issues hall-ticket at IGNOU website & please download it from IGNOU website only. Examination and also uploads the information on the university website. Please download the hall-ticket from the website and report to the Examination Centre with your Identity Card issued by the University.

x) Students will be allowed to appear in Term-end Examination for those courses only whose registration is valid and have completed the prescribed minimum duration of study.

5. **Date of Submission of Examination Forms & Fees**

   The Examination fees per course is ₹ 150/- the dates for submission of Examination forms for June and December Term-end Examinations are mentioned hereunder. The dates are prone to change. Please check http//www.ignou.ac.in for latest dates & schedule at IGNOU website under Registration online for submission of Examination form.

6. Please see the instructions under headline Instructions for submission of Examination forms there is online mode.

7. Students should carry their **Identity Card and intimation slip** (download hall ticket from IGNOU website indicating Centre & Date of Examination) to the Examination Centre.

8. In case a student fails to receive the intimation slip/Hall ticket may please contact at SED (SE-II) http://www.ignou.ac.in/ignou/aboutignou/division/sed/contact branch.

9. The students will be entitled to appear for the examination only at the study centre **OR** at the examination centre allotted to them and **NOT** at any other centre without specific permission from the University. The Examination Centre once opted for in a form shall not be changed.

10. Although all efforts will be made to declare the results in time, there will be no binding on the University to declare the results of the last examination before the commencement of next examination. The students may, therefore, fill up the examination form without necessarily waiting for the result and get it cancelled at a later date, if so desired. In case the student gets result after filling up the exam form, s/he should not re-appear in the course qualified by her/ him with a view to improve the qualified score.

11. The students can get their Term-end Examination result reevaluated. They should apply in prescribed form**.** Fee at the rate ₹ 750/- for reevaluation is charged per course. This amount is refunded if there is a mistake in checking of answer-book.

12. Duplicate Grade Card/marks sheet will be issued on a request from the students in prescribed form against payment of ₹ 200/- by Demand Draft drawn on IGNOU, New Delhi.

13. Students who fail to complete the minimum required number of course(s) prescribed for the Programme within the allotted period of study shall cease to be on the rolls of this University for that programme till they re-enroll themselves, if they wish to do so. For completing re-registration students are advised to get in touch with the Regional Director concerned.

14. **Obtaining Photocopy of Answer Scripts**
After the declaration of result, if the students are not satisfied with the marks awarded, they can request the University for Photocopy of Answer Scripts on payment of ₹ 100/- per course. The request for obtaining Photocopy of Answer Scripts by the student must be made within 45 days from the date of declaration of result to the Evaluation Centre concerned in the prescribed format along with the fee of ₹ 100/- per course in the form of Demand Draft in favour of IGNOU payable at the city where submitting the request for Photocopy. Format is available in the Programme Guide or IGNOU website: www.ignou.ac.in

15. **Early Declaration of Results**

In order to facilitate the students who have got offer of admission and or selected for employment etc and are required to produce marks-sheet/grade card by a specified given date may apply for early process of their answer-scripts and declaration of the results for this purpose. The students are required to apply in the specified format available on the University website with a fee of ₹ 1000/- per course through Bank Draft drawn in favour of IGNOU along with the attested photocopy of the offer of admission/employment offer. The students can submit their requests for early declaration before the commencement of the Term-end Examination i.e., before 1st June and 1st December respectively. The University in such cases will make arrangements for processing the answer-scripts and declare the results as a special case.

16. **Re-evaluation of Answer-script(s)**

The University has replaced the scheme of rechecking with the re-evaluation where by the answer-scripts will be re-evaluated by another Evaluator in case the students are not satisfied with the marks/grades secured by them in Term-end Examination. Such students can apply for re-evaluation within one month from the date declaration i.e. the date on which the results are made available on the University Website on payment of ₹ 750/- per course in the prescribed application form available on the University Website. The better of the two courses or original marks/grades and re-evaluated marks/grades will be considered and the revised marks/grades shall be incorporated in the students' record as applicable and the revised grade card/marks sheet will be sent to the students within one month from the receipt of application. Re-evaluation is not permissible for Projects, Practical, Assignments and Seminars etc.

17. **Improvement of Division/Class**

Keeping the interest of students who have completed their Bachelors Degree and Masters Degree Programmes, but falling short of 2% marks for securing 1st Division/2nd Division the university has made a provision for allowing such students to improve their performance. The improvement is permissible only in theory papers and the students may apply for improvement of their performance on the prescribed application format along with a fee of ₹ 750/- per course through a Bank Draft drawn in favour of IGNOU payable at Delhi and submit the application and fee to the Registrar, SRE Division, IGNOU, Maidan Garhi, New Delhi.

The improvement is not permitted to those students who have completed their maximum duration of the programme including the re-admission period has expired. The students will be given only one opportunity to improve the marks/grades and they can apply for improvement a maximum of 25% of the credits for successful completion of the respective programme. However, the sealing for the number of courses in which the student can improve is five courses. The better of the two examinations i.e., marks already awarded and the marks secured in the improvement examination will be considered.

6. OTHER USEFUL INFORMATION

6.1 Reservation of Seats

The University provides reservation of seats for Scheduled Castes, Scheduled Tribes and Physically Handicapped students as per the Government of India rules.

6.2 Scholarships and Reimbursement of Fee

Reserved Categories, viz., Scheduled Castes, Scheduled Tribes and Physically Handicapped students etc. have to pay the fee at the time of admission to the University along with other students. Physically Handicapped students admitted to IGNOU are eligible for Government of India scholarships. They are advised to collect scholarship forms from the respective State Government Directorate of Social Welfare or Office of the Social Welfare Officer and submit the filled-in forms to them **through the Regional Director of IGNOU concerned.**

Similarly, SC/ST students have to submit their scholarship forms to the respective State Directorate of Social Welfare or Office of the Social Welfare Officer, **through the Regional Director of IGNOU concerned for suitable reimbursement.**

6.3 Change/Correction of Address

There is a performa for change / correction of address available in this programme guide. This form duly filled in is to be submitted to the **Regional Director concerned**. Students are advised not to write letters to any other officer in the University in this regard. Normally, it takes 4-6 weeks to effect the change. Therefore, the students are advised to make their own arrangements to redirect the mail to the changed address during this period.

6.4 Change of Regional Centre and Study Centre

Counseling facilities are not available for all the programmes at all the study centres. As such, students are advised to make sure that counseling facilities are available, for the subject s/he has chosen, at the new centre opted for. Request for change of Study Centre is acceded to subject to availability of seats for the programme at the new centre asked for only on compelling grounds. Students are required to get a NOC from the Regional center where they are willing to get themselves transferred in view of the practical sessions involved in BCA.

When a student wants transfer from one region to another, s/he has to write to that effect to the Regional Centre from where s/he is seeking a transfer marking copies to the Regional Centre where s/he would like to be transferred to and also to Registrar (SRD), IGNOU, Maidan Garhi, New Delhi-110 068. Further, s/he has to obtain a certificate from the Co-ordinator of the Study Centre from where s/he is seeking transfer from, regarding the number of assignments submitted. The Regional Director from where the student is seeking the transfer will transfer all records including details of fee payment to the Regional Centre where the student is going, under intimation to the Registrar (SRD) and the student. The transfer will be permitted only if seats are available at the new Study Centre.

6.5 Procurement of Official Transcripts

The University provides the facility of obtaining official transcripts on request, made by the learners on plain paper addressed to the Registrar, Student Evaluation Division (SED), Block 12, IGNOU, Maidan Garhi, New Delhi-110068.

➢ **For Indian Students:**
   1) Rs. 300/- for each transcript, if to be sent to the Student/Institute within India
   2) Rs. 500/- for each transcript, if to be sent to the Student/Institute out of India

➢ For SAARC Countries Students:
   Rs. 1200/- for each transcript, if to be sent to the Student/Institute of SAARC Countries

➢ For Non-SAARC Countries Students:
   $ 120 for each transcript if to be sent to the Student/Institute of Non-SAARC Countries Format is available in the Programme Guide/IGNOU website: www.ignou.ac.in

6.6 Duplicate Grade Card

The learner can apply for obtaining duplicate Grade Card in case the same has been lost/misplaced/damaged, by making a request in prescribed format along with a fee of Rs. 250/- in the form of DD drawn in favour of IGNOU payable at New Delhi. Format is available in the Programme Guide or IGNOU website: www.ignou.ac.in . The request may be made to the Registrar, Student Evaluation Division, IGNOU, Maidan Garhi, New Delhi-110068

6.7 Study Materials for Your Programme of Study

[1]   After confirmation of admission, study materials are dispatched to the student's registered address by speed/ registered post.
[2]   Keep checking status of dispatch of study materials on the IGNOU website using the weblink, www.ignou.ac.in/ignou/aboutignou/division/mpdd/material, provided by MPDD.
[3]   If you received Study Material then visit Learner Support Centre (LSC) concerned with ID card for schedule of classes/lab
[4]   If you not received Study Material then visit Regional Centre concerned only or write to mpdd@ignou.ac.in

6.8 Disputes on Admission and other University Matters

In case of any dispute, the place of jurisdiction for filing of a suit/plaint/petition will be only at New Delhi / Delhi.

Term End Examination Form and other forms can be downloaded from http://www.ignou.ac.in

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7.   SOME USEFUL ADDRESSES

Telephone numbers of the Divisions/ Schools are provided on the website under the "Contact Us" option.

Students are advised to be in touch with their Study Centres for advance / timely / day-to-day information or visit the website with URL www.ignou.ac.in

For your information, the following officers deal with different educational aspects:

i)	Student Registration related issues	Registrar (SRD) Indira Gandhi National Open University , Maidan Garhi New Delhi -110068, 011-29532741 (SRD), 1302/1316 (SRD), Email: registrarsrd@ignou.ac.in
ii)	Exam Centres, Results, Rechecking of answer scripts, Discrepancies in Result, marks update etc.	Registrar (SED), Indira Gandhi National Open University , Maidan Garhi New Delhi -110068, Phone No: 011-29535828/2482 (SED), Phone No. 011-29572204/2205(SED), FAX No.011-29534429 068
iii)	Admission, Fees, Scholarship, Change of Course/Programme, Change of Address, Study Centre/ Regional Centre, Isssue of Bonafide Certificate, Migration Certificate, Duplicate Identity Card and Non-receipt of Self-learning/ Study Materials, Assignments etc.	Regional Director of concerned Regional Centre
iv)	Academic Matters	BCA Programme Coordinator Indira Gandhi National Open University Visveswarayya Bhawan, New Academic Complex, Maidan Garhi New Delhi - 110 068 Phone No. 011-29572902, Email: bca@ignou.ac.in
v)	Administrative and counseling matters, missing score of theory and practical assignments, Assessment Sheets	Co-coordinator of your Study Centre/Regional Director of the Regional Centre concerned
vi)	Issue of Degree/Diploma/Certificate, Despatch of returned Degrees, verification of Degree	Dy. Registrar (Exam-I) Examination –I Indira Gandhi National Open University, Maidan Garhi New Delhi -110068, Phone No.011-29535438 Intercom No.2224/2213 e-mail exam1@ignou.ac.in
vii)	For any general assistance	Student Support Centre Indira Gandhi National Open University, Maidan Garhi New Delhi -110068, Phone: 011-29535714, 29572512, 29572514, 29533869 and 29533870 e-mail : ssc@ignou.ac.in

8. OLD QUESTION PAPERS

For your reference, old question papers for first two semesters are given below. If you want to download the previous year's question papers, download them from the option "For Students" then select "download" and select the "question papers" on the home page of University's website with the URL www.ignou.ac.in.

BCA FIRST SEMESTER MODEL/SAMPLE QUESTION PAPERS

BDP / BCA / BTS

Term-End Examination

December, 2017

FEG-2 : FOUNDATION COURSE IN ENGLISH-2

Time : 2 hours   *Maximum Marks : 50*

Note : *Answer **all** questions.*

1   Write a composition in about 350 words on any*one* of the following :   20
   (a) The importance of kindness and respect in the modern world
   (b) Print versus e-books — which one will stay ?
   (c) Living in harmony with nature
   (d) The importance of educating girls

2   Write a paragraph in about 200 words on any *one* of the following :   10
   (a) The season you enjoy the most
   (b) Listening to music
   (c) The ideal teacher
   (d) The role of friends in our lives

3   Write a letter to the municipal authorities in your city describing the problems being faced by the residents of your colony as roads have been dug up for sewer lines and then left unrepaired.   10
<div align="center">OR</div>
   Write a letter to the head of your institution pointing out how the campus has been defaced during students' elections. Please give solutions.

4   Read the following passage and make notes in an appropriate format. Give it a suitable title.   10

     Elderly care, or simply eldercare (also known in parts of the English speaking world as aged care), is the fulfillment of the special needs and requirements that are unique to senior citizens. This broad term encompasses such services as assisted living, adult day care, long term care, nursing homes (often referred to as residential care), hospice care, and home care.

Because of the wide variety of elderly care found nationally, as well as differentiating cultural perspectives on elderly citizens, it cannot be limited to any one practice. For example, many countries in Asia use government-established elderly care quite infrequently, preferring the traditional methods of being cared for by younger generations of family members.

Elderly care emphasizes the social and personal requirements of senior citizens who need some assistance with daily activities and health care, but who desire to age with dignity. It is an important distinction, in that the design of housing, services, activities, employee training and such should be truly customer-centred. It is also noteworthy that a large amount of global elderly care falls under the unpaid market sector.

The form of elderly care provided varies greatly among countries and is changing rapidly. Even within the same country, regional differences exist with respect to care for the elderly. However, it has been observed that the global elderly consume the most health expenditure out of any other age group. One must also account for an increasingly large proportion of global elderly, especially in developing nations, as continued pressure is put on limiting fertility and decreasing family size.

Traditionally, elderly care has been the responsibility of family members and was provided within the extended family home. Increasingly in modern societies, elderly care is now being provided by the state or charitable institutions. The reasons for this change include decreasing family size, the greater life expectancy of elderly people, the geographical dispersion of families, and the tendency for women to be educated and work outside the home. Although these changes have affected European and North American countries first, they are now increasingly affecting Asian countries as well.

In most western countries, elderly care facilities are residential family care homes, free-standing assisted living facilities, nursing homes, and Continuing Care Retirement Communities (CCRCs). A family care home is a residential home with support and supervisory personnel by an agency, organization, or individual that provides room and board, personal care and habilitation services in a family environment for at least two and no more than six persons.

BACHELOR'S DEGREE PROGRAMME
Term-End Examination
December, 2017
ELECTIVE COURSE: COMMERCE
ECO-001 : BUSINESS ORGANISATION

Time : 2 hours   *Maximum Marks : 50*
                                                          (Weightage : 70%)

*Note : Attempt both Part -*A *and Part - B.*

PART-A

1   Attempt any four of the following: 5+5+5+5

   (a)   Briefly explain the advantages of raising funds through the issue of debentures.

   (b)   Differentiate between business and profession.

   (c)   Explain the concept of 'entrepreneurship'.

   (d)   Write a short note on 'Recurring Deposit Account'.

   (e)   What are the essentials of a good transport system ?

   (f)   State the objectives of Public Enterprises.

PART-B

Attempt any three of the following questions :

2   What do you mean by 'business risk' ? Explain the process of risk management.   3+7

3   What is meant by Public Utility Undertaking ? Discuss the broad aspects of their pricing policies.   2+8

4   What is a stock exchange ? Explain the factors affecting the prices at a stock exchange.   3+7

5   Briefly describe the role of an entrepreneur in business promotion. How does an entrepreneur differ from a promoter ?   6+4

6   Explain the significance of foreign trade for a country, and state the problems encountered in foreign trade by Indian entrepreneurs.   4+6

BCS-011

BACHELOR OF COMPUTER APPLICATIONS
BCA (Revised)
Term-End Examination
December, 2017
BCS-011 : COMPUTER BASICS AND PC SOFTWARE

Time : 3 hours   *Maximum Marks : 100*
(Weightage : 75%)

Note : Question number 1 is compulsory and carries 40 marks. Attempt any three questions from the rest.

1. (a) Convert the following decimal numbers to binary number and hexadecimal number :   4
   (i)   125
   (ii) 0.025

   (b) Define the term Main Memory. List the differences between RAM and ROM.   4

   (c) Define the terms Tracks, Sectors and Cylinders in the context of a hard disk. A disk pack has 12 platters (plates) having 2048 tracks on every surface. It can store 1024 bytes per sector (assume each track has 512 sectors). Calculate the storage capacity of this disk in gigabytes.   6

   (d) List two functions of File management and three functions of Memory management systems in the context of Operating systems.   5

   (e) What is the role of a Compiler in a computer How is a Computer different from an Interpreter?   5

   (f) List the advantages of using formulae and macros in a spreadsheet software.   3

   (g) For the following IPv4 subnet masks, what would be the size of Net ID and Device ID ?   4
   (i)   255.255.0.0
   (ii) 255.255.255.0

   (h) What is LAN ? What are the advantages of LAN ?   5

   (i) What are the features of a browser software ?   4

2. (a) What is a Parallel port ? How is it different from a Serial port ? For connecting a printer, which of the two (serial/parallel) ports will be preferred ? Justify your answer.   6

   (b) Draw a flowchart to find the sum of the first n natural numbers.   8

(c) What is a Wiki ? What are its characteristics ? How can it be used for educational purposes ? Explain with the help of an example.   6

3. (a) What is meant by Open Source Software ? Explain the developmental model and licensing of open source software.   6

(b) Explain the uses and functions of the following networking devices :   8
   (i) Modem
   (ii) Repeater
   (iii) Router
   (iv) Gateway

(c) What are the various components of a CPU ? Explain the role of each component. How is a CPU interfaced with memory ?   6

4. (a) Differentiate between the following :   6
   (i) Packet and Circuit switching
   (ii) Full-duplex and Half-duplex data transmission
   (iii) Twisted pair and Optical fibre cable

(b) Explain the advantages of source data-entry devices. Describe the features of any three source data-entry devices.   8

(c) Explain the features of Procedural Programming Languages with the help of an example. How is Object Oriented Programming different from Procedural Programming ?   6

5. (a) Explain any *five* of the following with the help of an example/diagram, if required :   20
   (a) Disk Defragmenter
   (b) Workstation
   (c) CD-ROM Disk Layout
   (d) Advantages of e-mail
   (e) Two-Tier Client-Server Architecture
   (f) Features of Project Management Software
   (g) Moodle
   (a) DNS

BACHELOR OF COMPUTER APPLICATIONS
BCA (Revised)
Term-End Examination
December, 2017
BCS-012 : BASIC MATHEMATICS

Time : 3 hours   *Maximum Marks : 100*

Note : Question number 1 is compulsory. *Attempt any* three *questions from the rest.*

1. (a) Show that   5

$$\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 2 \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$$

   (b) Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ and $f(x) = x^2 - 4x + 7$.
   Show that $f(A) = O_{2x2}$. Use this result to find A^5.   5

   (c) Find the sum up to n terms of the series   5
   $0.4 + 0.44 + 0.444 + \ldots$

   (d) If $1, \omega, \omega^2$ are cube roots of unity, show that   5
   $(1 + \omega)(1 + \omega^2)(1 + \omega^3)(1 + \omega^4)(1 + \omega^6)(1 + \omega^8) = 4$.

   (e) If $y = ae^{mx} + be^{-mx} + 4$, show that   5
   $$\frac{d^2y}{dx^2} = m^2(y - 4)$$

   (f) A spherical balloon is being inflated at the rate of 900 cubic centimetres per second. How fast is the radius of the balloon increasing when the radius is 25 cm ?   5

   (g) Find the value of λ for which the vectors   5

   $$\vec{a} = 2\hat{i} - 4\hat{j} + 3\hat{k}, \ \vec{b} = \lambda\hat{i} - 2\hat{j} + \hat{k},$$

   $$\vec{C} = 2\hat{i} + 3\hat{j} + 3\hat{k} \text{ are co-planar.}$$

   (h) Find the angle between the pair of lines   5
   $$\frac{x - 5}{2} = \frac{y - 3}{3} = \frac{z - 1}{-3}$$
   $$\frac{x}{3} = \frac{y - 1}{2} = \frac{z + 5}{-3}$$

2. (a) Solve the following system of equations by using matrix inverse :   5
   $3x + 4y + 7z = 14, \ 2x - y + 3z = 4,$
   $x + 2y - 3z = 0$

(b) Show that A = $\begin{bmatrix} 3 & 4 & -5 \\ 2 & 2 & 0 \\ 1 & 1 & 5 \end{bmatrix}$ is row equivalent to I_3. 5

(c) Use the principle of mathematical induction to prove that
$$1^3 + 2^3 + \ldots + n^3 = \frac{1}{4} n^2 (n+1)^2$$
for every natural number n. 5

(d) Find the quadratic equation with real coefficients and with the pair of roots
$$\frac{1}{5-\sqrt{72}}, \frac{1}{5+6\sqrt{2}}$$ 5

3. (a) How many terms of the G.P $\sqrt{3}$, 3, $3\sqrt{3}$,.. add up to $120 + 40$, $\sqrt{3}$? 5

(b) If $\left(\frac{1-i}{1-i}\right)^0 = a + ib$, then show that $a = 1$ and $b = 0$. 5

(c) Solve the equation $8x^3 - 14x^2 + 7x - 1 = 0$, the roots being in G.P. 5

(d) Solve the inequality $\left|\frac{x-4}{2}\right| \leq \frac{5}{12}$ and graph the solution set. 5

4. (a) Determine the values of x for which the following function is increasing and for which it is decreasing :
$f(x) = x^4 - 8x^3 + 22x^2 - 24x + 21$ 5

(b) Show that $f(x) = 1 + x^2 \, ln \left(\frac{1}{x}\right)$ has a local maximum at $x = \frac{1}{\sqrt{e}}$, $(x > 0)$. 5

(c) Evaluate the integral $\int \frac{dx}{1+3e^x+2e^{2x}}$ 5

(d) Find the length of the curve $y = \frac{2}{3} x^{3/2}$ from $(0, 0)$ to $\left[1, \frac{2}{3}\right]$ 5

5. (a) Check the continuity of a function f at $x = 0$:
$f(x) = \begin{matrix} \frac{2|x|}{x}; & x \neq 0 \\ x; & x=0 \end{matrix}$ 5

(b) Find the Vector and Cartesian equations of the line passing through the point $(1, -1, -2)$ and parallel to the vector $3\hat{i} - 2\hat{j} + 5\hat{k}$. 5

(c) Find the shortest distance between the lines
$\vec{r} = (3\hat{i} + 4\hat{j} - 2\hat{k}) + t(-\hat{i} + 2\hat{j} + \hat{k})$ and

$\vec{r} = (\hat{i} - 7\hat{j} - 2\hat{k}) + t(\hat{i} + 3\hat{j} + 2\hat{k})$. 5

(d)   Find the maximum value of $5x + 2y$ 5
subject to the constraints
$$-2x - 3y \leq -6$$
$$x - 2y \leq 2$$
$$6x + 43r \leq 24$$
$$-3x + 2y \leq 3$$
$$x \geq 0, \ y \geq 0$$

BACHELOR OF COMPUTER APPLICATIONS

BCA (Revised)

Term-End Examination

December, 2017

BCSL-013(P)/S1 : COMPUTER BASICS AND PC SOFTWARE LAB

Time : 2 hours   *Maximum Marks : 100*
(Weightage : 50)

Note : *(i) There are five questions carrying 80 marks.*

(ii) The remaining 20 marks are for viva-voce.

(iii) All questions are **compulsory.**

1 (a)   Execute the following Linux commands :   10
(b)   Pwd
(ii)   chmod
(iii)   whoami
(iv)   cat
(v)   Diff

(b)   Write all the steps for installing device drivers on your   6
system.

2   Create a PowerPoint presentation on the features of an   16
operating system.

• For each of the slides you should have timer based
transition.

• All slides should have slide notes.

• All slides should follow the common design : i.e.,
same title style, footer and page numbers.

• Add a video to at least one slide which can be run in
full screen option.

3 (a)   Create multi-level monthwise activities to be completed.   6
Months should be numbered as   1- 12. For each month,
activities (like preparing assignment, solving problems,
going to library, etc.) to be completed should be in
alphabetical order (a, b, c, ...).

(b)   Design a flyer for a birthday party for your friend. Use   10
different font styles, sizes, colors and effects.

4   Type in the labels, the student number, assignment and   16
TEE results and weightage for assignment and TEE. The
total marks for each student and class averages need to
be calculated. The class average for assignment, TEE (P)
and TEE (Theory) is simply the average of each
component: assignment, TEE (P) and TEE (Theory)
separately. While calculating the total marks you must
use weightage for each component. All marks are out of
100.

1	A	B	C	D	E
2	Student	Assignment	TEE (P)	TEE (T)	Total
3	S1	70	40	60	
4	S2	60	30	70	
5	S3	70	40	75	
6	S4	80	50	80	
7	Class average	-	-	-	-
8	Weightage	0.25	0.15	0.6	

5   Suppose you are organizing a birthday party. You are   16
required to fix timings for inviting friends, book a venue
for the party, select menu and inform all your friends
through e-mail.

(a)   Write all the steps available in Outlook to fulfil the
scenario above.

(b)   Add your signature to the e-mail message.

9. FORMS AND ENCLOSURES

In this section, we are enclosing the samples of some forms, which are useful to you. Whenever you have to correspond with the university, please get the photocopy of the relevant form, fill it carefully and send as per instructions therein. The detailed instructions for all these-forms are provided in this programme guide in different sections. The following forms are enclosed.

Note: You may use the photocopies of the forms provided in programme guide.

Enrolment No. ☐☐☐☐☐☐☐☐☐ Programme: ☐

Name

Course Code:

Medium: English/Hindi

S.No.

	Sr.No. ———————————
	Date of Receipt: ———————————
	Name of Evaluator:
	Date of dispatch to the Evaluator: ———————————
	Date of receipt from Evaluator:

Sig. of dealing Accountant Date:

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
ASSIGNMENTS REMITTANCE-CUM-ACKNOWLEDGEMENT FORM

Enrolment No. ☐☐☐☐☐☐☐☐☐   Programme: ☐

Medium: English/Hindi

Name ———————————

Course Code; ———————————

S.No. Assignment No.
—————————————
—————————————
—————————————
—————————————

Signature of the Student ———————————

FOR OFFICE USE ONLY

Sr.No ———————————

Signature of receiver

Date ———————————

Seal.

Notes : 1. Submit this form to the coordinator of your study centre alongwith the assignment.
2. When you submit the assignment by post, enclose a self-addressed stamped stamped envelop along with this.

CHANGE/CORRECTION OF ADDRESS AND STUDY CENRTE

If you change your address please complete the form using block capitals and indicating :

Programme of Study
Enrolment Number
Name
New or Corrected Address inlcuding Pin
New Study Centre Code
Choice for Medium of Study
Date of Change

For change/correction of address and or change of study centre the form should be mailed to the Director of your concerned Regional Centre.

NOTE : TWO FORMS ARE PRESENTED IN THIS PAGE, USE THE RELEVANT FORM ONLY.

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
ASSIGNMENTS REMITTANCE-CUM-ACKNOWLEDGEMENT FORM

Programme Code ☐

Enrolment Number ☐☐☐☐☐☐☐☐☐

Date Change effective from ☐

Name ☐

New Address

☐

Existing Study Centre Code ☐☐☐☐

Town
State
State Code ☐☐ (See Code List 2 of Guide to Applicant)
Pin ☐☐☐☐☐☐

New Study Centre Code : ☐☐☐☐

Signature :   Date:

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INDIRA GANDHI NATIONAL OPEN UNIVERSITY
(SED)
Maidan Garhi, New Delhi-110068

APPLICATION FORM FOR ISSUE OF PROVISIONAL CERTIFICATE

Enrolment No. ☐☐☐☐☐☐☐☐☐

Programme Title ....

Regional Centre ....

Name : ....

Father's Name ....

Month and year of last
examination in which you
have completed the Programme ....

Address:..

....

....

(Please Enclose a Copy of Your complete grade card).

Filled in Application Form should be sent to:

Registrar (SED)
IGNOU
Maidan Garhi,
New Delhi-110 068

Date ....
                                                             Signature

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
Student Evaluation Division

APPLICATION FORM FOR RE-EVALUATION OF ANSWER SCRIPT

1. Name:……………………………………………………………….

2. Programme: [   ] Enrolment No. [| | | | | | | |]

3. Address: ………………………………………………………………..

    ………………………………………………………………………….

    PIN: [| | | | |]

4. Contact No: (Mobile No.)……………………….Landline No:…………………………

5. Month and Year of the Exam:……………………………………………………….

6. Examination Centre Code : [   ]

7. Address of the Examination Centre :……………………………………….......

    …………………………………………………………………………………

8. Courses, in which   COURSE CODE   MARKS/GRADE OBTAINED
    Re-evaluation is sought

    ………………….   ……………………………..

    ………………….   …………………………...

    ………………….   …………………………...

    ………………….   ……………………………..

9. Fee Details:

    (The fee for Re-evaluation of answer script is ₹ 750/-per course for Indian Students & ₹ 1200/- for SAARC Countries Students and $75 for Non-SAARC Countries Students, which is to be paid through demand draft drawn in favour of 'IGNOU' payable at the City of Evaluation Centre)

    No. of Course(s) …………………..X ₹ 750/-   =   Total Amount :…………………………

    Demand Draft No. …………………………   Date …………………………...…

    Issuing Bank …………………………………………….........................………

    Date: ……………………   Signature of the student

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RULES & REGULATIONS FOR RE-EVALUATION OF ANSWER SCRIPTS

1. The request for re-evaluation by the student must be made within one month of declaration of his/her result.

2. The date of declaration of result will be calculated from the date on which the result(s) are placed on the IGNOU website.

3. After re-evaluation, the better of the two scores of original marks/grade and marks/grade after reevaluation will be considered.

4. The revised marks/grade after re-evaluation shall be communicated to the student on receipt of reevaluation result and result of re-evaluation will also made available on the IGNOU website at www.ignou.ac.in. The minimum time required for re-evaluation shall be 30 days from the date of receipt of application.

5. Re-evaluation is permissible in TEE only and not in the Project/Dissertation, Practicals / Lab courses, Workshops, Assignments & Seminar etc.

6. On the top of the envelope containing the prescribed application form, please mention 'APPLICATION FORM FOR RE-EVALUATION OF ANSWER SCRIPTS'

7. The application form duly filled-in may be send to the following address except CPE* & DPE* programmers.

8. Application form must reach within the prescribed dates at the following address:-

Sl. No.	Address of Evaluation Centre	Jurisdiction of Evaluation Centre
1.	Regional Director, IGNOU Regional Evaluation Centre, 3 rd Floor, Sanchi Complex, Shivaji Nagar, Bhopal-462016 Madhya Pradesh	All Examination Centres within Bhopal, Jabalpur, Raipur, Ranchi, Patna, Darbhanga, Bhagalpur, Jodhpur and Jaipur
2.	Regional Director , IGNOU Regional Evaluation Centre, C/1, Institutional Area, Bhubaneswar-751013 Odisha	All Examination Centres within Bhubaneswar, Koraput, Kolkata, Deoghar, Siliguri, Raghunathganj, Vishkhapatnam, Vijayawada, Hyderabad
3.	Dy. Registrar IGNOU Regional Evaluation Centre-Delhi Block-5, IGNOU, Maidan Garhi, New Delhi-110068 Ph.- 011-29533565, 011-29571501	All Examination Centres within Delhi-1, Delhi-2, Delhi-3, All Schools and Divisions, Centres, Units & Institutes at Headquarters, International Division and answer scripts received from other Evaluation Centres/sources, if any.
4.	Deputy Registrar, IGNOU Regional Evaluation Centre, IGNOU Complex, Kaloor PO Ernakulam Distt, Kochi-682017 Kerala Ph.- 0484-2337028, 2337038	All Examination Centres within Kochi, Trivandrum, Vatakara, Chennai, Madurai, Banglore, Bijapur, Panaji, Port Blair, Mumbai, Pune, Nagpur, Rajkot, Ahmedabad
5.	Dy. Registrar IGNOU Regional Evaluation Centre-Lucknow IInd Floor, 5 C / INS-1, Sector-5, Vrindavan Yojana , Telibagh, Lucknow –226029 Ph.- 0522-2442825	All Examination Centres within Lucknow, Varanasi, Aligarh, Dehradun, Noida, Karnal, Chandigarh, Khanna, Shimla, Jammu, Srinagar
6.	In-Charge IGNOU Regional Evaluation CentreShillong, IGNOU Regional Centre, NEHU Campus, Umshing, Mawkynroh, Shillong-793022 Meghalaya Ph.- 0364-2550130	All Examination Centres within Shillong, Guwahati, Jorhat, Itanagar, Imphal, Agartala, Gangtok, Kohima, Aizwal

* For the revaluation of the answer script(s) of CPE and DPE Programmes, the application form may be sent to the Regional Centre concerned.

ignou
THE PEOPLE'S
UNIVERSITY

Control No. ....

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI-110068

APPLICATION FORM FOR OBTAINING DUPLICATE GRADE CARD/MARK-SHEET

Name : ....

Enrolment No. ☐☐☐☐☐☐☐☐☐

CompleteAddress:...

....

....

PIN : ☐☐☐☐☐☐

Contact No: (Mobile No.) …………………………… Landline No: ………………………..

Programme ....

Month and Year of the Exam : ....

Centre from where appeared at
last examination : ....

Bank Draft/IPO No. .... Dated ....
for ₹ 200 in favour of IGNOU, New Delh...
in favour of "IGNOU" payable at New Delhi

....
Signature

Date : ....

Note : Fee for duplicate grade card is ₹ 200/- for Indian Students & ₹ 400/- for SAARC Countries
Students and $10 for Non-SAARC Countries Students. The duplicate grade card/mark sheet
will be sent by Registered post by the University.

The filled in form with the requisite fee is to be sent to:

Registrar (SED)
Indira Gandhi National Open University
Block 12, Maidan Garhi
New Delhi-110 068

(You are advised to use the photocopy of this proforma)

INDIRA GANDHI NATIONAL OPEN UNIVERSITY

(To be submitted to the concerned Regional Director)

APPLICATION FORM FOR ISSUE OF MIGRATION CERTIFICATE

1. Name : ....

2. Father's Name: ....

3. Address:...

4. Particulars of last examination

Examination Passed (programme)	Year of Passing	Enrolment No.	Marks Obtained	Grades Obtained

5. Name of the Regional Centre and Study Centre to which the candidate attached

    ....

6. Name of the University to which the candidate wants to migrate

    ....

Draft Details

Amount Rs. …………………………….. D.D. No………………………… Date…………………

Bank Name & ………………………….. Place of Issue …………………………………………………

---

1. I hereby declare that the information provided is correct to the best of my knowledge and I have paid all the fee due to the University.

2. I have not taken any migration certificate from the University before this.

3. I further certify that I have not enrolled with any other University/Institution after passing out from IGNOU up to this date.

4. **I also undertake that I am not enrolled in any other programme of IGNOU at present.**

5. In the event of any of the above information being found incorrect, the Certificate shall be liable for cancellation by the University.

Date : ....   Signature of the Applicant

(To be filled in by the Regional Centre/SE Division)

1. The information furnished by Shri/Smt./Km. .... is correct as per Grade Card.

2. He/She may be issued the Migration Certificate applied for ....

Date .... Dealing Assistant .... Section Officer ....

INSTRUCTIONS

1. A fee of ₹ 400/- should be remitted by way of a Demand Draft drawn in favour of IGNOU and payable at the city of the Regional Centre or New Delhi, as the case may be.

2. At the time of submission of the application for issue of Migration Certificate, the applicant should attach Xerox copy of consolidated Statement of Marks of provisional Certificate issued by this University (duly attested) for verification.

3. Duplicate Migration Certificate can be issued on payment of ₹ 400/- only in case the same has been lost, destroyed or mutialted, on submission of an Affidavit drawn up on a non-judicial stamp paper of the value of ₹ 10/- to be sworn before a Migistrate on the following format.

AFFIDAVIT

"I, _____ son/daughter of _____ resident of _____ hereby solemnly declare that the Migration Certificate No. _____ dated _____ issued to me _____ University has been lost and did not join any other University on the basis of the same nor have I submitted the Migration Certificate for joining any other University".

(DEPONENT)

ignou
THE PEOPLE'S UNIVERSITY

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI-110068
FORM OF APPLICATION FOR ISSUE OF A DUPLICATE COPY OF UNIVERSITY DIPLOMA/DEGREE/CERTIFICATE

Note: For Instructions, please see reverse.

To
The Registrar
Student Evaluation Division
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068

Received Rs. …………………
Bank Draft No………………..
Dealing Assistant
IGNOU

Sir,

I wish to have a duplicate copy of my Diploma/Degree/Certificate for the Programme................
Examination for the following reasons:

....
....

The prescribed fee of ₹ 750.00 is submitted herewith.

The required particulars are given below:

Name of Candidate (in Block Letters in English): _____

(in Hindi) : _____

Father's Name (in Block Letters): _____

Programme : [_____]   Enrolment Number: [_____]

Contact No: (Mobile No.) _____ Landline No: _____

Examination Passed in Term End Examination – (June/December & year)

Result: _____Grade/Division _____

Name of the Study Centre   :_____

Name of the Regional Centre   :_____

& other particulars   :_____

Full Permanent Address of student : _____

_____

I solmnly declare that the particulars given above are correct to the best of my knowledge.

Yours faithfully.

Signature of the Student

Postal Address: _____

_____

I Certify that the above entires made by the applicant are correct.

Signature of Regional Director
With Stamp

Note: To be filled in duplicate, original copy will be forwarded by Regional Director to Registrar (SED) and duplicate copy to be retained by the Regional Director for reference.

INSTRUCTIONS TO CANDIDATES FOR ISSUE OF DUPLICATE COPY OF UNIVERSITY DEGREE/DIPLOMA/CERTIFICATE

1. Fee for issuing a duplicate (a) Diploma (b) Degree & (c) Certificate:-

   (i) ₹ 750/- for Indian Students

   (ii) ₹ 1500/- for SAARC Countries Students

   (iii) $50 for Non-SAARC Countries Students

(THE REQUISITE FEE IS REQUIRED TO BE PAID THROUGH DEMAND DRAFT DRAWN IN FAVOUR OF 'IGNOU' PAYABLE AT NEW DELHI')

2. The form should be filled in duplicate legibly and signed by the candidate

3. The form should be submitted through the Regional Director of the concerned Regional Centre through which the candidate appeared at the said examination, and duplicate copy will be sent through the Regional Director concerned.

4. A duplicate copy of the Diploma, Degree or Certificate will be issued on submission of an affidavit signed by a First Class Magistrate together with an attested copy of the F.I.R. lodged with the nearest Police Station to this effect by the candidate on the grounds that either the original Diploma, Degree or Certificate has been irrecoverably lost destroyed or defaced and on payment of the fee prescribed.

5. In very special cases subsequent copies of the Diploma, Degree or Certificate may be issued for not more than four times, on submission of an affidavit signed and certified by a First Class Magistrate to the effect that the Diploma, Degree or Certificate issued previously by the University has been lost or destroyed, and on payment of the fee as prescribed for the issue of duplicate copy.

FORM FOR AFFIDAVIT TO BE EXECUTED ON A NON-JUDICIAL STAMP PAPER OF THE VALUE OF ₹ 10/- BEFORE A FIRST CLASS MAGISTRATE

I _____ Son/Daughter of Shri _____ do hereby

solemnly declare that the original Degree Certificate dated _____ issued to me by the Registrar,

Student Registration & Evaluation Division, Indira Gandhi National Open University, Maidan Garhi-

110068 on my having passed the _____ examination in _____

_____ under University Enrolment No. _____ has been lost/destroyed.

I have filed an F.I.R. with _____ Police Station_____ and a

copy of the same duly attested by a Gazetted Officer/First Class Magistrate is appended hereto.

I also undertake that if my Original Diploma/Degree/Certificate which has been lost is put to any unfair use by the person who may lay hands on it. I shall stand for the damages which may accrue from such use.

Deponent

Signature_____
Address _____

Verification

Verified _____ this _____ day of _____20 that the contents of my affidavit are true to the best of my knowledge.

Deponent

SWORN BEFORE ME

Signature _____

Designation _____

Office Seal _____

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
STUDENT EVALUATION DIVISION

APPLICATION FORM FOR IMPROVEMENT IN DIVISION/CLASS

(Rules & regulations are mentioned on the reverse side of this form. Please go through them carefully before filling up the form).

Prescribed dates for submission of form: 1st to 30th April for June Term-end Exam.
1st to 31st October for December Term-end Exam.

1. Name: ....

2. Programme:………………………   Enrolment No:………………………

3. Address: ....

    ....

    ………………………………………………   Pin | | | | | |

4. Contact No: (Mobile No.)……………………………Landline No:……………………………

5. Term-end examination, in which programme completed (June and December & year):.........

6. Total marks/Overall point grade obtained   Percentage obtained

    ....

    (Please enclosed photocopy of the statement of marks/grades card)

. Courses(s), in which improvement is sought:

	COURSE CODE	COURSE CODE
1. ———————————		4. ——————————— ––-
2. ———————————		5. ———————————
3. ———————————		

6. **Fee details:**

    (The fee for Improvement in Division/Class is ₹ 750/- per course for Indian Students & ₹ 2000/- for SAARC Countries Students and $60 for Non-SAARC Countries Students, which is to be paid through demand draft drawn in favour of "IGNOU" payable at New Delhi)

    No. of Course(s): ……………… X ₹ 750/-=   Total Amount: ….........................

    Demand Draft No.: ………………………   Date: ….....................................

    Issuing Bank: ………………………………………………………......................

7. Term-end examination, in which you wish to appear:- June/December 20……………………

8. Examination centre details, where you wish to appear in term-end examination:-

    Exam. Centre Code…………….   City/Town ....

    ....

UNDERTAKING

I hereby undertake that I shall abide by the rules & regulations prescribed by the University for improvement in Division/Class

Date:...........................   Signature…………………..

Place: ………………..   Name:……………………...

RULES & REGULATION FOR IMPROVEMENT IN DIVISION/CLASS

1. The improvement of marks/grades is applicable only for the Bachelor's/Master's Degree Programmes, who have completed the programme. The eligibility is as under:-

    a) The students of Bachelor's/Master's Degree Programmes who fall short of 2% marks to secure 2nd and 1st division.
    b) The students of Master's Degree Programmes only, who fall short of 2% marks to secure overall 55% marks.

2. Only one opportunity will be given to improve the marks/grade.

3. The improvement is permissible only in theory papers. No improvement is permissible in Practicals/Lab courses, Projects, Workshops and Assignments etc.

4. Under the Provision of improvement, a maximum of 25% of the maximum credits required for successful completion of a programme shall be permitted.

5. Students wishing to improve the marks will have to apply within six months from the date of issue of final statement of marks/grade card to them, subject to the condition that their registration for the programme/ course being applied for improvement, is valid till the next term-end examination in which they wish to appear for improvement.

6. No student will be permitted to improve if maximum duration to complete the programme, including the re-admission period, has expired.

7. After appearing in the examination for improvement, better of the two examinations, i.e. marks/grade already awarded and the marks/grade secured in the improvement examination will be considered.

8. In case of improvement, the month and year of completion of the programme will be changed to the Term-end examination, in which students appeared for improvement.

9. Students will be permitted for improvement of marks/grades provided the examination for the particular course, in which they wish to improve, is being conducted by the University at that time.

10. On the top of the envelope containing the prescribed application form, **Please mention**

    "APPLICATION FORM FOR IMPROVEMENT IN DIVISION/CLASS.

11. Application form must reach within the prescribed dates at the following address:-

    The Registrar,
    Student Evaluation Division,
    Indira Gandhi National Open University,
    Maidan Garhi,
    New Delhi-110068

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
STUDENT EVALUATION DIVISION

APPLICATION FORM FOR EARLY DECLARATION OF RESULT OF TERM-END EXAMINATION

(Rules & regulations are mentioned on the reverse side of this form. Please go through them carefully before filling up the form).

1. Name : ....

2. Programme: [   ]   Enrolment No: [ ][ ][ ][ ][ ][ ][ ][ ][ ]

3. Address: ....

....

.... Pin [ ][ ][ ][ ][ ][ ]

4. Contact No: (Mobile No.)……………………………………Landline No:…………………………………….

5. Reason for early declaration of result: ....

....

   (Enclose a copy of the documentary evidence specifying the reason for early declaration)

6. Courses(s) detail for early evaluation:-

S. No.	Course Code	Date of Examination
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____

7. Exam. Centre details, from where you have to appear/appeared at Term-end Examination:-

   Exam. Centre Code: [   ]

   Address of Exam. Centre: ───

   ───

7. **Fee detail:**

   (The fee for early declaration of result is ₹ 1000/- per course for Indian Students & ₹ 1200/- for SAARC Countries Students and $50 for Non-SAARC Countries Students, which is to be paid through demand draft drawn in favour of 'IGNOU' payable at the City of Evaluation Centre)

   No. of Course(s): …………….…… X ₹ 1000/- = Total Amount: …...................................

   Demand Draft No.: …………….……………… Date: ……...

   Issuing Bank: …………………………………………………………….........................

   Date:........................... **(Signature of the student)**

RULES & REGULATIONS FOR EARLY DECLARATION OF RESULTS

1. Request for early declaration of results will be entertained for final semester/year or maximum of 4 backlog courses only, subject to the following conditions:-

    i)   The student has been selected for higher study/employment and statement of marks/grade card is required to be produced to the institute by a particular date, which is before the prescribed dates of declaration of the University's results.

    ii) The student has completed all the other prescribed components except the term-end examination of the courses, for which early evaluation has been sought.

2. Application for early declaration, for the reasons such as to apply for recruitment/higher study/post and promotion purpose etc. will not be entertained.

3. Application without enclosing documentary evidence specifying the reason for early declaration will not be entertained.

4. Application form must reach at the following address before the date of the examination for the course (s) for which early evaluation is sought:-

Sl.No.	Address of Evaluation Centre	Jurisdiction of Evaluation Centre
1.	Regional Director, IGNOU Regional Evaluation Centre, 3 rd Floor, Sanchi Complex, Shivaji Nagar, Bhopal-462016 Madhya Pradesh	All Examination Centres within Bhopal, Jabalpur, Raipur, Ranchi, Patna, Darbhanga, Bhagalpur, Jodhpur and Jaipur
2.	Regional Director , IGNOU Regional Evaluation Centre, C/1, Institutional Area, Bhubaneswar-751013 Odisha	All Examination Centres within Bhubaneswar, Koraput, Kolkata, Deoghar, Siliguri, Raghunathganj, Vishkhapatnam, Vijayawada, Hyderabad
3.	Dy. Registrar IGNOU Regional Evaluation Centre-Delhi Block-5, IGNOU, Maidan Garhi, New Delhi-110068 Ph.- 011-29553565, 011-29571501	All Examination Centres within Delhi-1, Delhi-2, Delhi-3, All Schools and Divisions, Centres, Units & Institutes at Headquarters, International Division and answer scripts received from other Evaluation Centres/sources, if any.
4.	Deputy Registrar, IGNOU Regional Evaluation Centre, IGNOU Complex, Kaloor PO Ernakulam Distt, Kochi-682017 Kerala Ph.- 0484-2337028, 2337038	All Examination Centres within Kochi, Trivandrum, Vatakara, Chennai, Madurai, Banglore, Bijapur, Panaji, Port Blair, Mumbai, Pune, Nagpur, Rajkot, Ahmedabad
5.	Dy. Registrar IGNOU Regional Evaluation Centre-Lucknow IInd Floor, 5 C / INS-1, Sector-5, Vrindavan Yojana , Telibagh, Lucknow –226029 Ph.- 0522-2442825	All Examination Centres within Lucknow, Varanasi, Aligarh, Dehradun, Noida, Karnal, Chandigarh, Khanna, Shimla, Jammu, Srinagar
6.	In-Charge IGNOU Regional Evaluation CentreShillong, IGNOU Regional Centre, NEHU Campus, Umshing, Mawkynroh, Shillong-793022 Meghalaya Ph.- 0364-2550130	All Examination Centres within Shillong, Guwahati, Jorhat, Itanagar, Imphal, Agartala, Gangtok, Kohima, Aizwal

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN CARRl, NEW DELHI-110068
APPLICATION FORM FOR OBTAINING PHOTOCOPY OF THE ANSWER SCRIPT

(Rules & regulations are mentitned on the reverse side of this form. Please go through them carefully before filling up the form).

Prescribed dates for submission of form:- 1st March to 15th April for June Term-end Exam.
1st September to 15th October for December Term-end Exam.

1. Name ....

2. Programme: [   ]   Enrolment No: [ ][ ][ ][ ][ ][ ][ ][ ][ ]

3. Address : ....

     ....

     ....Pin Code [ ][ ][ ][ ][ ][ ]

4. Detail of the course(s), for which photocopy of the answer script(s) is/are required:

    (a) Term-end examination: June/December....................

                                         [ ][ ][ ][ ][ ]   (b) Exam Centre Code:

    (c) Exam Centre Address :   ....
                                         ....
                                         ....

    (d) Course(s)   ....

5. Fee details:-

    (The fee for this purpose is ₹ 100/- per course, which is to be paid through demand draft drawn in favour of IGNOU & payable at the City of Evaluation Centre).

    No. of Course(s) : .... X ₹ 100/-   Total Amount: ....

    Demand Draft No. :......................................   Date : ....

    Issuing Bank : ....

6. Self attested photocopy of the Identity Card : Attached/Not attached
    issued by the University.

UNDERTAKING

I hereby undertake that the answer script(s), for which photocopy(ies), applied for, belongs to me. For this purpose, I am enclosing self attested photocopy of my Identity Card issued by the University. In case, my statement is found false, the University may take action against me as deemed fit.

Date : ....   Signature ....

Place : ....   Name : ....

RULES & REGULATION FOR OBTAINING PHOTOCOPY OF THE ANSWER SCRIPT

Photocopy(ies) of answer script(s) shall be provided to the students from December-2008 termend

1. The date of declaration of result will be calculated from the date on which the result are placed on the IGNOU website.

2. The fee for photocopy of the answer script shall be ₹ 100/- (Rupees One Hundered Only) per course.

3. Application form without self attested photocopy of the Identity Card of the student will not be entertained.

4. Student's application form for photocopy (ies) of the answer script(s) shall reach the Concerned Authority (as mentioned below in the last para) alongwith the prescribed fee within 45 days from the date of declaration of result. The date of receipt of application for June term-end examination shall be by 15th October and for December term-end examination by 15th April or within 45 days from the date of declaration of result on the University's website, whichever your later.

5. The students, who find that any portion of the answer was not evaluated or any totaling error is noticed, may point out the same and submit their representation alongwith a copy of the answer script supplied to them within 15 days. No other query regarding evaluation of answer script shall be entertained.

6. The students, who intend to apply for photocopy(ies) of the answer script(s) may simultaneously apply for re-evaluation, if they so desire. The last date for submission of application for re-evaluation will not be extended to facilitate them to point out discrepancy in the evaluation.

7. The application form duly filled-in may be sent to the following address except CPE & DPE programmes:-

Sl.No.	Address of Evaluation Centre	Jurisdiction of Evaluation Centre
1.	Regional Director, IGNOU Regional Evaluation Centre, 3 rd Floor, Sanchi Complex, Shivaji Nagar, Bhopal-462016 Madhya Pradesh	All Examination Centres within Bhopal, Jabalpur, Raipur, Ranchi, Patna, Darbhanga, Bhagalpur, Jodhpur and Jaipur
2.	Regional Director , IGNOU Regional Evaluation Centre, C/1, Institutional Area, Bhubaneswar-751013 Odisha	All Examination Centres within Bhubaneswar, Koraput, Kolkata, Deoghar, Siliguri, Raghunathganj, Vishkhapatnam, Vijayawada, Hyderabad
3.	Dy. Registrar IGNOU Regional Evaluation Centre-Delhi Block-5, IGNOU, Maidan Garhi, New Delhi-110068 Ph.- 011-29533565, 011-29571501	All Examination Centres within Delhi-1, Delhi-2, Delhi-3, All Schools and Divisions, Centres, Units & Institutes at Headquarters, International Division and answer scripts received from other Evaluation Centres/sources, if any.
4.	Deputy Registrar, IGNOU Regional Evaluation Centre, IGNOU Complex, Kaloor PO Ernakulam Distt, Kochi-682017 Kerala Ph.- 0484-2337028, 2337038	All Examination Centres within Kochi, Trivandrum, Vatakara, Chennai, Madurai, Banglore, Bijapur, Panaji, Port Blair, Mumbai, Pune, Nagpur, Rajkot, Ahmedabad
5.	Dy. Registrar IGNOU Regional Evaluation Centre-Lucknow IInd Floor, 5 C / INS-1, Sector-5, Vrindavan Yojana , Telibagh, Lucknow –226029 Ph.- 0522-2442825	All Examination Centres within Lucknow, Varanasi, Aligarh, Dehradun, Noida, Karnal, Chandigarh, Khanna, Shimla, Jammu, Srinagar
6.	In-Charge IGNOU Regional Evaluation CentreShillong, IGNOU Regional Centre, NEHU Campus, Umshing, Mawkynroh, Shillong-793022 Meghalaya Ph.- 0364-2550130	All Examination Centres within Shillong, Guwahati, Jorhat, Itanagar, Imphal, Agartala, Gangtok, Kohima, Aizwal

8. For the photocopy(ies) of the answer script(s) of CPE & DPE programmes, the application form may be sent to the Regional Centre concerned.

INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI-110068

APPLICATION FORM FOR ISSUE OF OFFICIAL TRANSCRIPT

1. Name : ....

2. Programme : [   ]   Enrolment No. : [   ]

3. Address : ....

   ....

   ....Pin [   ]

4. Contact No: (Mobile No.)…………………………Landline No:…………………………………..

5. Purpose for which, transcript is required ....

6. **Fee for the official transcript:- (Please note: Per transcript means one photocopy of one certificate, hence, each photocopy, which is required to be attested by the University will be charged on the following prescribed rates):**

   (i) - ₹ 300/- per transcript for Indian Students, if transcript is required to be sent to the Student/Institute within India.

   (ii) - ₹ 500/- per transcript for Indian Students, if transcript is required to be sent to the Student/Institute outside India.

   (iii)- ₹ 600/- per transcript for SAARC Countries Students, if transcript is required to be sent to the Student/Institute within India and ₹ 1200/- per transcript for the same students, if transcripts is required to be sent to the outside India.

   (iv) - $60 per transcript for Non-SAARC Countries Students, if transcript is required to be sent to the Student/Institute within India and $120 per transcript for the same students, if transcript is required to be sent to the outside India.

   (The requisite fee is required to be paid through demand draft drawn in favour of 'IGNOU' & payable at 'New Delhi')

7. No. of transcript(s) required: .... X ₹ 300/- ₹ 500/-or……….……………… = total Amount : ₹ ....

   Demand Draft No. : ....Date : ....Issuing Bank : ....

8. Mention the Name of Student/Programme & Enrolment No. at back side of above demand draft.

9. Name & Address of the University/Institute/Employer (In capital letters) to whom transcript is required to be sent (attached a separate list, if required)

   ....

   ....

   ....

10. **If, the Transcript is required to collect Personally : Name…………………………………… Mobile No…………………(Please see Instructions in back-side at Point-C)**

Date :........................   (Signature of the student)

INSTRUCTIONS FOR "OFFICIAL TRANSCRIPT"

(A)- The filled in form duly signed by the student with the requisite fee & documents may be sent to:-

> **The Registrar,**
> **Student Evaluation Division, Indira Gandhi National Open University,**
> **Block-12, Maidan Garhi, New Delhi-110068 (INDIA)**

(B)- The students are required to enclose same number of legible photocopies of both sides of the statement of Marks-sheet/Grade Card/Provisional Certificate and Degree Certificate etc. issued to them, as the number of transcripts are required. Each photocopy of the certificate is chargeable as mentioned at prescribed format under Point No.-6. Incomplete application will be entertained.

(C)- If the Student/Applicant has applied for Official Transcript and wants to collect the same Personally or ByHand himself/herself from the Section Officer, Exam.-III Section of SED, Block-12, Room No.-10, IGNOU, Maidan Garhi, New Delhi-110068 (India) then He/She is required to mention such information & Mobile No. under Point No.-10 in prescribed format for calling them provided that He/She has to produce the valid Original Identity Card/Votter Card/Aadhar Card/PAN Card/Driving License or Passport etc. for signature/photograph/residential Id. Proof. at the time of collecting their Transcripts.

Note:- If the student want to collect his/her transcript by-hand through any other person from the above Section then the receiver has to produce all above documents of the student alongwith "AuthorizationLetter" of the concerned student. The person who want to receive the Transcript(s) on behalf of the student, has to produce his/her valid Original Identity Proof for signature/photograph/residence etc. like Identity Card/Votter Card/Aadhar Card/PAN Card/Driving License etc.and he is also required to submit the copies of the same to this Section at the time of collecting the Transcript.

(D)– The University has been sending/dispatching the "Official-Transcripts" under sealed envelope(s) through Indian Speed Post Services and the normally, the Exam-III Section of SED takes minimum 15 days for the issuance/dispatching the "Official Transcript(s)" after receiving the Application-Form of the student at this Section but "Dispatching/Issuance time depends on furnishing the Verification Report by another Sections and circumstances surrounding the case.

(E)- As per the requirement, the demand draft of requisite fees should be reached to this Division prior to 60 days or earlier from the expiry of the same demand draft for smooth transaction with the bank.

(F)– Under the existing procedure, the University issues the "Official Transcripts" on "University Letter-Head" duly signed & verified on current status of each copy of Mark-sheet/Grade-card/PC/ Degree Certificate etc. by the authorized Officer on behalf of the Registrar (SED) or Controller of the Examinations, containing the following information therein:-

i) Attested copies of Mark-sheet/Grade-card/PC/ Degree Certificate etc. including detailed information about the "Programme" completed by the Student / Details of the Courses/ Scheme of Assessment of Student's Performance / Minimum Standard for Completion of the Courses and Programme / Scheme of Study / Duration of Programme / Year of Admission & Completion of Programme / Mode of study / Medium of study etc. This information is based on the current status of the Mark-sheet/Grade card.

ii) Recognition of the University and authenticity of its Degrees/Diploma etc. It is also clarified in the "Official Transcript" that the University does not issue Year-wise/Semester-wise Mark-sheet/Gradecard but issue a comprehensive Mark-sheet/Grade-card after successful completion of the programme to the students.

(G)- The inquiry about status of the "Official Transcript" submitted by the student/applicant can be obtained from "Official Transcript Counter" Exam.-III Section of SED (Block-12, Room No.-10), IGNOU, Maidan Garhi, New Delhi-110068 personally or on Telephone No. 011-29572210 between Monday to Friday during Office hours after 15 to 25 days of receiving the Application-Form at this Section.

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THE PEOPLE'S
UNIVERSITY

(For Change of Address, send it duly filled-in to the concerned Regional Director, who will forward it to the Registrar (SRD), Maidan Garhi, New Delhi after verification)

Application for Change of Address

Date: _____

To

The Registrar, SRD
IGNOU
Maidan Garhi
New Delhi-110 068.

THROUGH THE REGIONAL DIRECTOR CONCERNED

Enrolment No._____

Programme_____

Name (in caps)_____

1. DETAILS FOR CHANGE/CORRECTION OF MAILING ADDRESS

New Address   **Old Address**

_____   _____

_____   _____

_____   _____

_____   _____

City_____Pin_____   City_____Pin_____

State_____   State_____

_____
Signature of the Student

STUDENT REGISTRATION DIVISION
INDIRA GANDHI NATIONAL OPEN
UNIVERSITY MAIDAN GARHI, NEW DELHI -
110 068

Dates for submission: 1st Aug. to 31st Oct. or 1 st Feb. to 30th April

RE-ADMISSION FORM FOR BCA (Revised Syllabus)

1. Name & Address of the student :_____

    _____

2. Programme Code : ⬚⬚⬚⬚⬚⬚

3. Enrol. No. : ⬚⬚⬚⬚⬚⬚⬚⬚⬚

4. Regional Centre Code: ⬚⬚

5. Study Centre Code : ⬚⬚⬚

6. Details of course(s) not completed for which re-admission is sought (please enclosed a separate Annexure, if the table below is found insufficient).

S.No.	Course Code	Title of the Course	Credits	Course Fee (₹)
			Total Rs.	

7. Details of re-registration for missed year(s)/semester(s), if any :

Year(s)/ semester(s)	Course Code(s) of the missed year(s)/semester(s)	Re-registration fee a per current rate (₹)

8. Total Fee (col.no.6+7) (₹) _____ enclosed vide Demand Draft No._____

    Date _____of _____(Name of

    Bank) (DD should be drawn in favour of "IGNOU" payable at New Delhi)

    Dated:_____   Signature of the student

Mail this **Re-admission Form** along with DD to Registrar, Student Registration Division, IGNOU, Maidan Garhi, New Delhi-110068 on or before the last date mentioned above.

Note : **Please retain a copy of the form for any future reference.**

RULES & GUIDELINES FOR RE-ADMISSION

1. Re-admission is permissible in the following cases:

   (a) Students who failed to complete the requirements In full or in part within the maximum span period prescribed.

   (b) Students who failed to complete the requirement of attendance in practicals as prescribed in Programme curriculum within the maximum span period prescribed.

2. Students who did not register for all years/semesters of a Programme and fail to pay the prescribed full Programme fee during the maximum duration of the Programme are also eligible for Re-admission, provided they pay full fee for the missed year(s)/ semester(s) as per rate applicable for the session for which they seek re-admission, in addition to the pro-rata course fee for re-admission.

3. Course fee paid for re-admission would be valid for a period of six months/one year/two consecutive academic years or four consecutive semesters only, as given below:

   Two years - for all undergraduate and post-graduate programmes whose minimum duration is of 2 years and above.

4. The additional period indicated at point no.3 above will commence from the date of completion of the maximum duration of the Programme for which the registration was done initially, even if the re-admission is sought at a later date.

5. Students shall not be on rolls of the university beyond the additional period indicated at point no. 3 above.

6. The credit earned by the student towards his/her courses and assignments successfully completed shall be retained for the revalidated period, provided the syllabus and methodology now in vogue are similar to the course(s) successfully completed earlier.

7. No study material will be supplied on re-admission. If the earlier study material is replaced, the student will be required to buy changed course material.

8. The students will be allowed to take re-admission in the old course(s) as long as the examination in the old course(s) is conducted by the University and subject to validity of re-admission period indicated at point number 3 above.

9. For the Programmes containing practical component, the norms of fee payable will be as decided by the respective Schools.

10. Pro-rata fee for Re-admission would be changed as and when the University revises the Programme fee for various Programmes.

11. Other conditions as prescribed by the University relating to the admission and re-admission shall remain the same.

12. The Demand Draft for Re-admission fee together with the re-registration fee of the missed year(s)/semester(s), if any, should be drawn in favour of IGNOU payable at New Delhi. Please write your Enrol. No., Name and Prograrnrne code and also the words 'Re-admission' on the reverse of the DD.

NOTE :

i) Maximum duration in case of Direct admission to 3rd sem. MCA (under Lateral Entry scheme) is **four** years For Integrated BCA-MCA programme, the maximum duration is **eight years.**

ii) BCA (revised syllabus) pro-rata fee will be carried out in due course.

QR Code of Some of the Useful Web Links

eGyankosh
(for Online Course Materials)

Online Re-Registration Form

iGRAM
(IGNOU Grievance control Room)

To Watch Live Telecast/
To listen live Broadcast

BCA Assignments

Online Examination Guidelines and Form

BCA - Old Question Papers

Forms for Students

Note: The above QR Codes can be scanned and open through and QR Code Scanner Application/App.