

**PROGRAMME GUIDE
FOR
BACHELOR OF COMPUTER APPLICATIONS
(Online)**

**(Programme Code: BCAOL)
January 2023**



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

www.ignou.ac.in

Programme Guide:

January, 2023. This is a Programme Guide for BCAOLOnline (Programme Code: BCAOL) offered by IGNOU.

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Further information on the Indira Gandhi National Open University courses can be obtained from the University's office at MaidanGarhi, New Delhi-110 068 or from its Regional Centres spread across the length and breadth of the country.

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MESSAGE FROM PROGRAMME COORDINATOR

Dear Student,

Welcome to the family of online learners and IGNOU's Bachelor of Computer Applications (BCAOL) Programme. BCAOL is a 3-year (6 semesters) Programme during which you will study a wide range of courses in Computer Science and Applications along with a course of Basic Mathematics, Business Organisation, Accountancy and Communication Skills. The BCAOL Programme is of 99 credits. This online programme's learning content will be made available through the Learning Management System (LMS) of IGNOU's online programmes through the link: <https://iop.ignouonline.ac.in/programme/p19>. In addition, you may also visit IGNOU websites iop.ignouonline.ac.in -> Announcements and <http://www.ignou.ac.in> for current information and updates. In your case, IGNOU Regional Centre Delhi-1 is identified as Nodal Centre for academic counseling, practical counselling and other academic activities.

This Programme Guide contains instructional system of IGNOU online BCAOL (3 Years) programme, syllabus of BCAOL (3 Years) programme, details of evaluation scheme. The self-instructional course material will be uploaded on the IGNOU LMS. Assignments are one of the essential components of learning and evaluation. You can download the assignments of the semester in which you have enrolled from the IGNOU website. Each course contains one assignment. All the assignments will be submitted online, and one must submit the assignment of every course before the due date to be eligible to appear for the related Term-end Examination. COE, IGNOU will be facilitating your online learning process. You may contact COE at iopsupport@ignouonline.ac.in and coe@ignou.ac.in. Also, during the study, if you have any feedback, suggestions and comments to make about the LMS, please write to iopsupport@ignouonline.ac.in.

You will be provided online counselling for all the theory and practical courses for which you will get communication from the Nodal Regional Centre (RC)/ Study Center designated by Nodal RC for BCAOL. You must have a computer system with the necessary software for the practical courses. The Nodal RC will communicate the list of software required for BCAOL. You need to have a minimum of 70% attendance for practical counselling sessions to be eligible for appearing for the Term-end Practical Examinations.

For your online counselling and assignments related queries, you may write at bcaol@ignou.ac.in (If you are BCAOL student) and rcdelhi3@ignou.ac.in (If you are BCAOL student under e-VidyaBharati). For any academic feedback, you may write to BCAOL Programme Coordinator at the email bcaolsocis@ignou.ac.in with a CC at bcaol@ignou.ac.in. You can also write to us on iGRAM(<http://igram.ignou.ac.in>). You must write your enrolment number and mention your Programme Code as BCAOL indicating that you are a student of the online mode in every communication with the University.

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 BCAOL 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 BCAOL Programme that are specified or not specified in the Programme Guide, at any time.

I wish you all the success in pursuing the BCAOL programme.

Prof. Divakar Yadav

**BCAOL Programme Coordinator
Email ID: bcaolsocis@ignou.ac.in**

1. BASIC INFORMATION

1.1 BCAOL 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 (BCAOL) 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 BCAOL 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

Re-registration: You are required to reregister for the subsequent semester by paying the fee, for continuation of your study. You can re-register through online re-registration portal of IGNOU before a specified last date. **Last date of Re-Registration is announced on the registration portal of IGNOU. In general, the re-registration is to be done about 2 months prior to the start of the next semester.** Follow the updates from Announcements section at: <https://iop.ignouonline.ac.in/announcements/0> and <https://e-vbab.ignouonline.ac.in/announcements/0> (for e-Vidyabharti students)

1.3 Medium of Instruction

The medium of instruction is in **English**.

1.4 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.**

1.5 BCAOL 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 BCAOL:

BCAOL Programme Structure

Semester	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-I	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
	MCS-014	Systems Analysis and Design	3
III	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
	BCS-040	Statistical Techniques	4
	MCS-024	Object Oriented Technologies and Java Programming	3
IV	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	Introduction to Algorithm Design Lab	1
	BCS-051	Introduction to Software Engineering	3
	BCS-052	Network Programming and Administration	3
V	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
	BCS-062	E-Commerce	2
	MCS-022	Operating System Concepts and Networking Management	4
VI	BCSL-063	Operating System Concepts and Networking Management Lab	1
	BCSP-064	Project	8

No. of Theory Courses: 24; No. of Practical Courses: 14; Project: 01; Total Credits: 99

1.6 Recognition

IGNOU is a Central University established by an Act of Indian 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 Circulars F-1/8/92(CPP) dated Feb.1992 and F1-52/ 2000 (CPP-II) dated 5 May, 2004 & AIU Circular No. EV/B (449)/94/177115 dated January 14, 1994.

In recognition of the pre-eminence of IGNOU and its quality of education and degrees offered, IGNOU has been exempted from seeking approval from UGC for offering programmes in ODL and Online MODE (as per UGC notification F.No.1-19/2020(DEB-I) dated March 25, 2021.

You may download all the recognition related information from the following web links.

<http://www.ignou.ac.in/ignou/aboutignou/division/srd/new>
<http://ignou.ac.in/ignou/aboutignou/division/srd/Recognition>

1.7 Student Support

For the online learners IGNOU has created a Learning Management System (LMS) for online BCAOL, which is available through the IGNOU online website at the link: <https://iop.ignouonline.ac.in/programme/p19>. In addition, learners may also visit IGNOU website: <http://www.ignou.ac.in> for various information.

The University may not be able to communicate to all the students individually; therefore, one should visit the IGNOU online web site and IGNOU website on a regular basis, so as to get the latest information about assignments, submission schedules (assignments and examination forms), declaration of results, etc.

1.7.1 BCAOL Nodal Regional Centres:

The Nodal Regional center for BCAOL students is RC Delhi-1(bcaol@ignou.ac.in) and for BCAOL students under e-Vidyabharti Project is RC Delhi-3 (rcdelhi3@ignou.ac.in)

1.8 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/>.**

1.9 Contact information of BCAOL Programme Coordinator

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

2. INSTRUCTIONAL SYSTEM

The methodology of instruction for online mode in this University is different from that of the conventional universities. The online learning mode of the University system is more learner-oriented, and the student has to be an active participant in the teaching-learning process. The University follows a multi-channel approach for instruction. After admission is confirmed, learner will receive credentials through email for accessing the learning management system (<https://iop.ignouonline.ac.in/programme/p19>). In addition to the components, which are placed on the course pages of LMS, learner shall also get the support for learning through the following:

- self-instructional material (SIM) in pdf or other electronic form
- self-assessment questions, as check your progress, which are part of SIMs
- recorded video programmes for various courses
- online theory counselling
- compulsory online practical counselling
- eGyankosh
- web-based support
- assignments
- GyanDarshan Channel, including teleconferencing,
- GyanVani.
- SWAYAMPBABA-DTH (channel-19)

2.1 Self-Instructional Material

Self-instructional materials and recorded video programmes are the primary form of instructional materials. A basic unit of material is called a block. 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. 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 self-instructional material alone may not be sufficient to write assignments and prepare for the Term-end Examinations. The self-instructional material is made available through LMS on the IGNOU online website at the link: <https://iop.ignouonline.ac.in/programme/p19>. **There is no provision of hard copy of self-instructional material for online students.**

2.2 eGyankosh, SWAYAMPBABA-DTH (Channel-19) and IGNOU eContent App

eGyankosh(www.egyankosh.ac.in) is a digital repository consists of the reference links Self instructional materials, recorded videos, YouTube-video archives etc. Various links for the eGyankosh related to SOCIS are:

eGyankosh Homepage: <http://www.egyankosh.ac.in/>

Self-Learning Material: <https://www.egyankosh.ac.in/handle/123456789/401>

YouTube-Video Archives: <http://www.egyankosh.ac.in/handle/123456789/35748>

The **SWAYAMPBABA-DTH Channel-19** (Professional and Vocational Education) is funded by MoE, Govt. of India and Coordinated by IGNOU, New Delhi. This is an exclusive channel covering IGNOUs' Professional and Vocational Education Programmes. This channel broadcasts visually high-quality and graphically enriched video content of IGNOUs' Certificate/Diploma/PG Diploma/PG Certificate/Undergraduate/Postgraduate courses pertaining to Computer

Science/Application, Management Studies, Vocational Education, Engineering and Technology, Law Extension and Development Studies, Social Work, Journalism and New Media Studies, Performing Arts and Health Sciences. These video lectures are delivered by Faculty of IGNOU and also from renowned institutional in India, covering basics to advanced courses. Gradually, IGNOU is recording and pooling the videos on Channel-19

SWAYAM PRABHA homepage: <https://www.swayamprabha.gov.in/>

Professional and Vocational Education (Channel-19):

https://www.swayamprabha.gov.in/index.php/program/current_he/19

Archive Video: https://www.swayamprabha.gov.in/index.php/program/archive_he/19

IGNOU eContent App

The self-instructional course material of various programmes of IGNOU are made available through **IGNOU eContent APP**

<https://play.google.com/store/apps/details?id=ac.in.ignou.Viewer&hl=en>

2.3 Counseling Sessions

For the online BCAOL programme, theory and practical counselling sessions may be conducted through online mode. Normally, these sessions will be held online on Saturdays and Sundays. However, the counselling sessions may be conducted on weekdays too.

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

2.3.1 Theory Sessions

In online mode, the interaction 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. There are academic counsellors to provide online counselling and guidance to you in the courses that you have chosen for study.

You should note that the counselling sessions would be different from 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 BCAOL programme. In these sessions, you must try to resolve your subject-based difficulties and any other related problems.

2.3.2 Practical counselling Sessions and Compulsory Attendance

The practical counselling sessions will also be held online. The participants should have their own facility to use the computer and software packages relevant to the syllabus. No hardware or software will be provided by IGNOU. The following points regarding the practical attendance must be noted:

- i) 70% attendance is compulsory for each lab course. This is a pre-requisite for taking the term-end practical examination in the respective lab courses. Student attendance will be recorded course-wise in online counseling sessions.
- ii) A student who fails to fulfil the 70% attendance requirements will be allowed to re-register for that lab course on payment of pro-rata fee. Though 70% attendance is compulsory for each lab course. **However, this condition is not applicable for the computer time given for assignment implementation.**

- iii) Students are required to prepare a separate lab record for each lab course. These lab records should be mailed to practical counselor after each session.
- iv) Strictly follow the guidelines given in the Lab manuals for the respective lab courses.
- v) No hardware or software facility will be provided by IGNOU for the online students. They have to make their own arrangements.

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. Unless you have gone through the Units, there may not be much to discuss and a counseling session may not be fruitful.

2.3.3 Counseling Session Details:

Course wise Number of Counseling Sessions (Theory/Lab)				
Sem-Ester	Course	Course Title	Credits	No. of Counseling 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
V	BCSL-045	Algorithm Design Lab	1	10
	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

2.3.4 Semester wise Counseling Sessions:

Semester	No. of Sessions	
	Theory	Practical
I	31	20
II	23	20
III	27	30
IV	28	50
V	43	30
VI	14	20
TOTAL	166	170

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

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

3. BROWSING IGNOU'S WEBSITE

The IGNOU's website is a dynamic source of latest information and is subject to continuous updates. Thus, various pages shown here may change in future. IGNOU itself is continuously changing to bring about improvement in quality of its services. You must visit IGNOU website for all the latest information, filling up or downloading various form, downloading of assignments, results etc.

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 HomePage of IGNOU's web site (Figure 1). Students need to click on various options to get the related information.

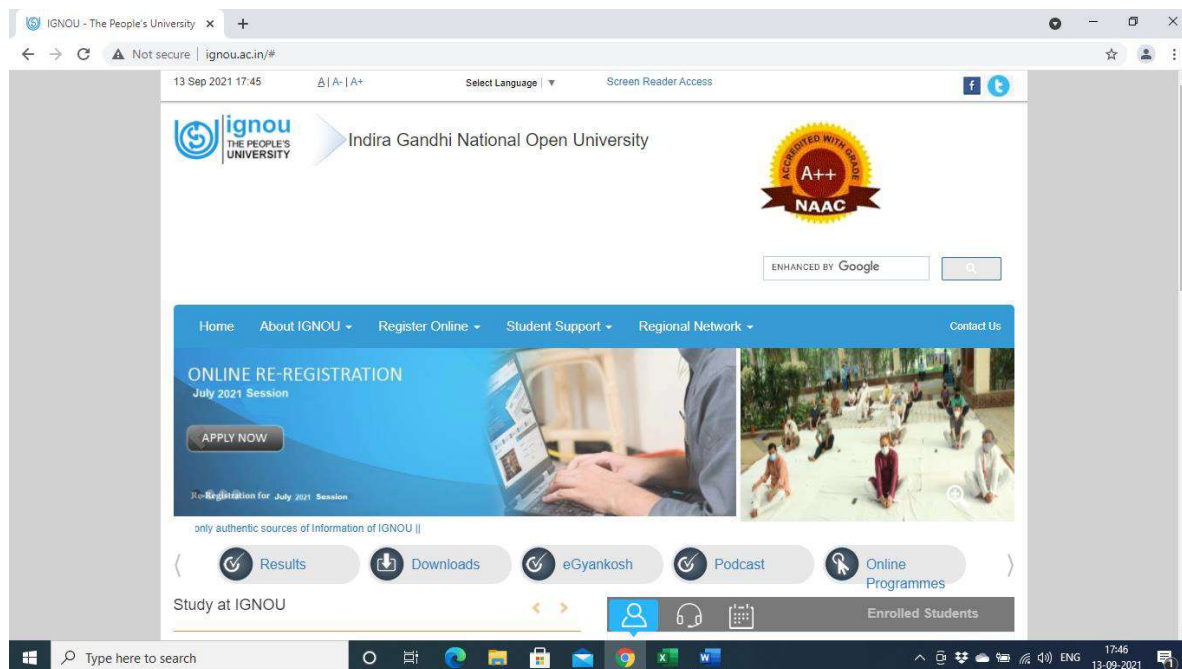


Figure 1: IGNOU Website

From this **Home page** Select **about IGNOU** which will display an Option List select **School of Studies**. It will show you a page of all the schools of studies of IGNOU, Select **School of Computer and Information Sciences (SOCIS)** to display page of SOCIS (Figure 2).

School of Computer and Information Sciences (SOCIS) offers the Computer Programmes: PhD, MCA_New, MCAOL, BCA, BCAOL, CIT, CITOL as PGDCA_New and CMAD shown in Figure 2.

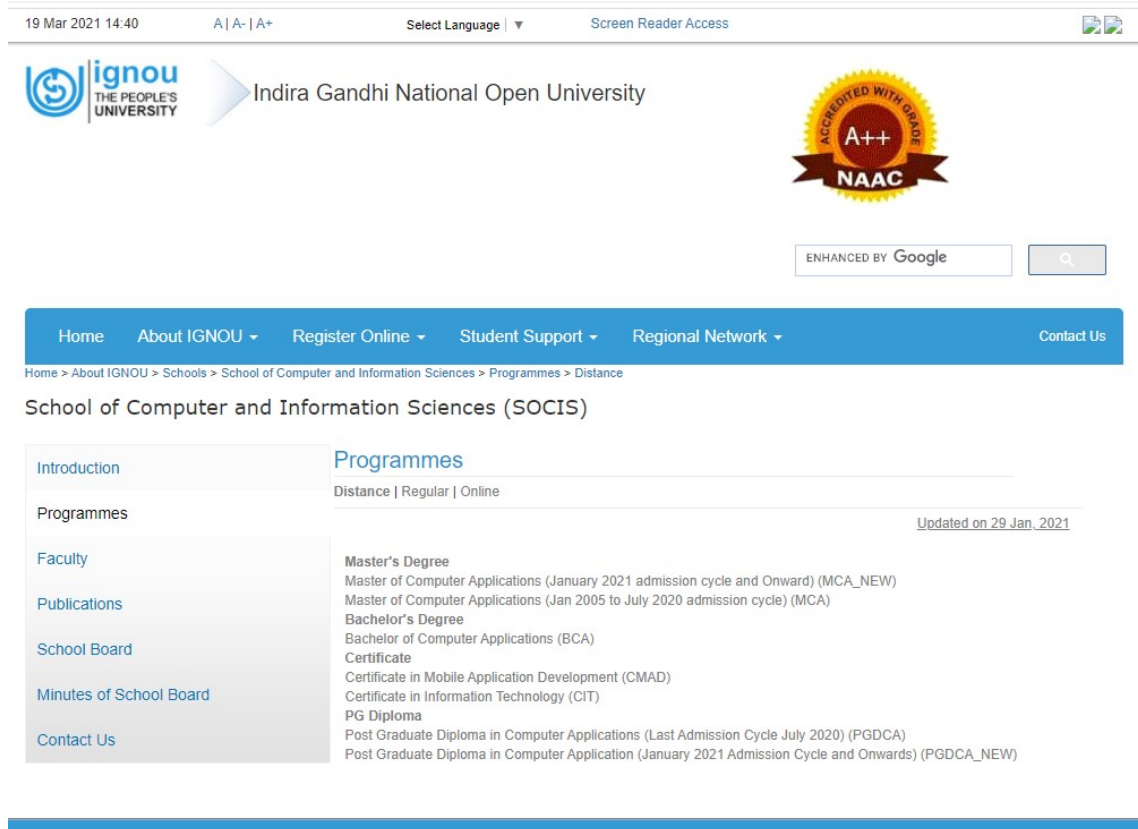


Figure 2: SOCIS Page on IGNOU Website

One of the most important link for students is Student Zone which can be reached from Home page by selecting Student Zone option on the Student Support Option List (Link address: <http://www.ignou.ac.in/ignou/studentzone>). Figure 3 displays the options of the Student Zone page. The question paper pattern for MCAOL is different from MCA_NEW. Hence, please donot rely on old question papers patterns.

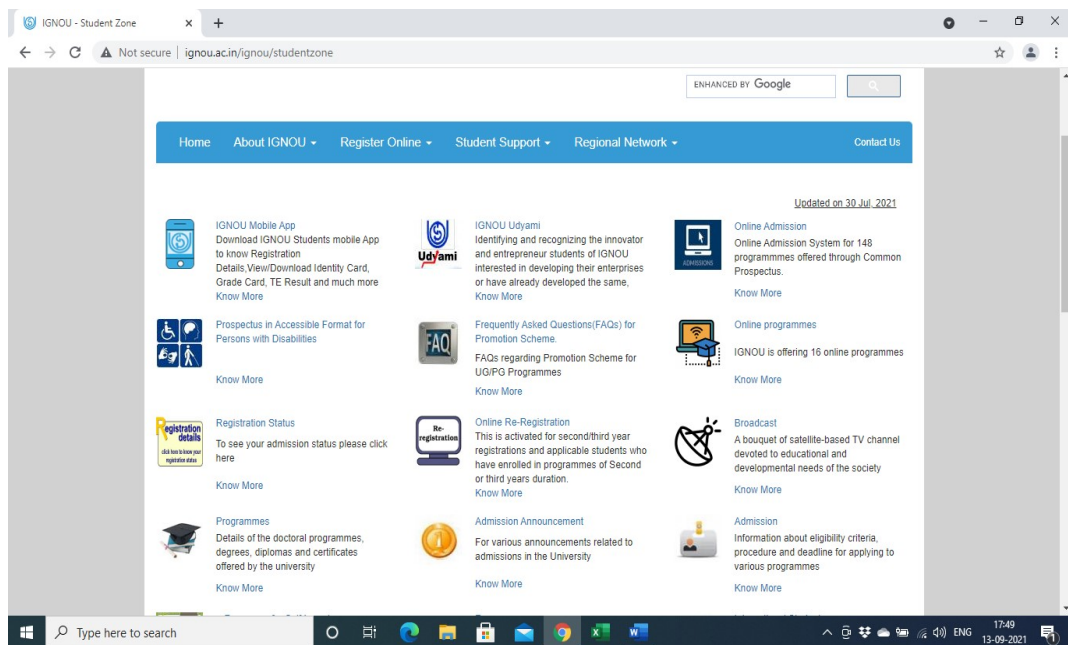


Figure 3: Student Zone page

3.2 Navigation from IGNOU's online Home Page

The learners can have access to IGNOU's online website at the following address (URL) <https://iop.ignouonline.ac.in/>. As students get connected to this site, the following page displays the Home Page of IGNOU's online web site (Figure 4). Students need to click on online program inside the programmes tab.

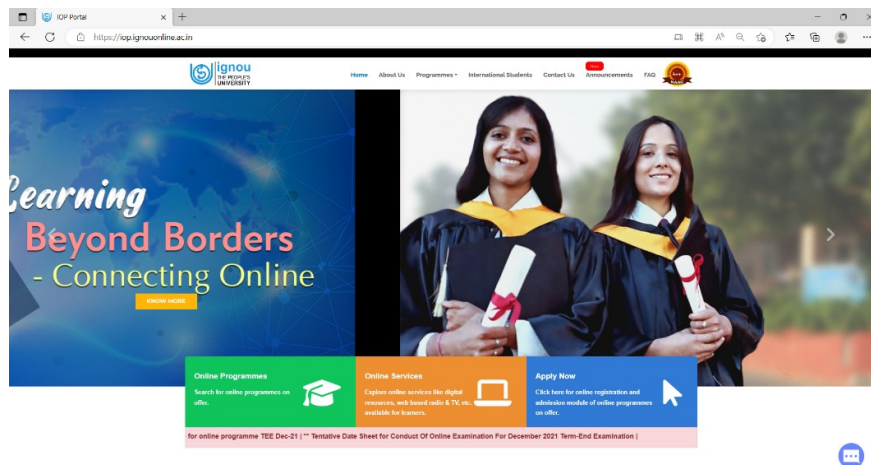


Figure 4: IGNOU's Online programme home page

After successful login Students can go through Self Learning Materials and assignments course wise, as shown in Figure 5.

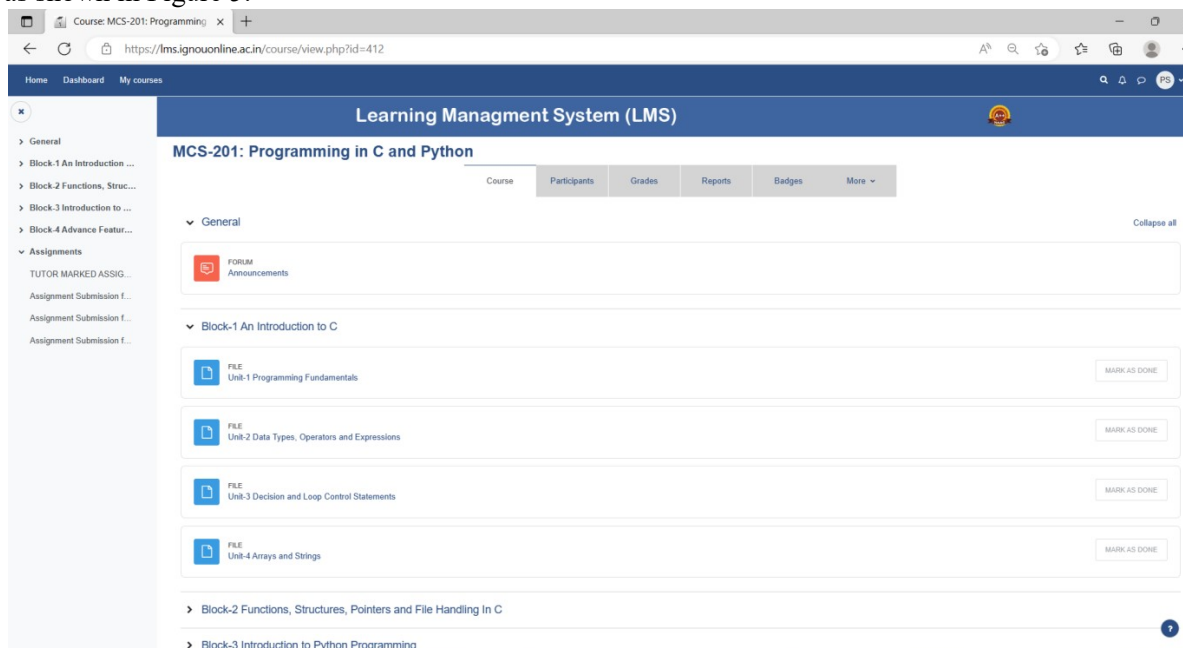


Figure 5: IGNOU's BCA Online programme home page

Navigation from eVidyaBharti Project

The learners can have access to eVidyaBharti online website at the following address (URL) <https://e-vbab.ignouonline.ac.in/>. As students get connected to this site, the following page displays the Home Page of eVidyaBharti web site (Figure 6). Students need to click on online program inside the programmes tab.

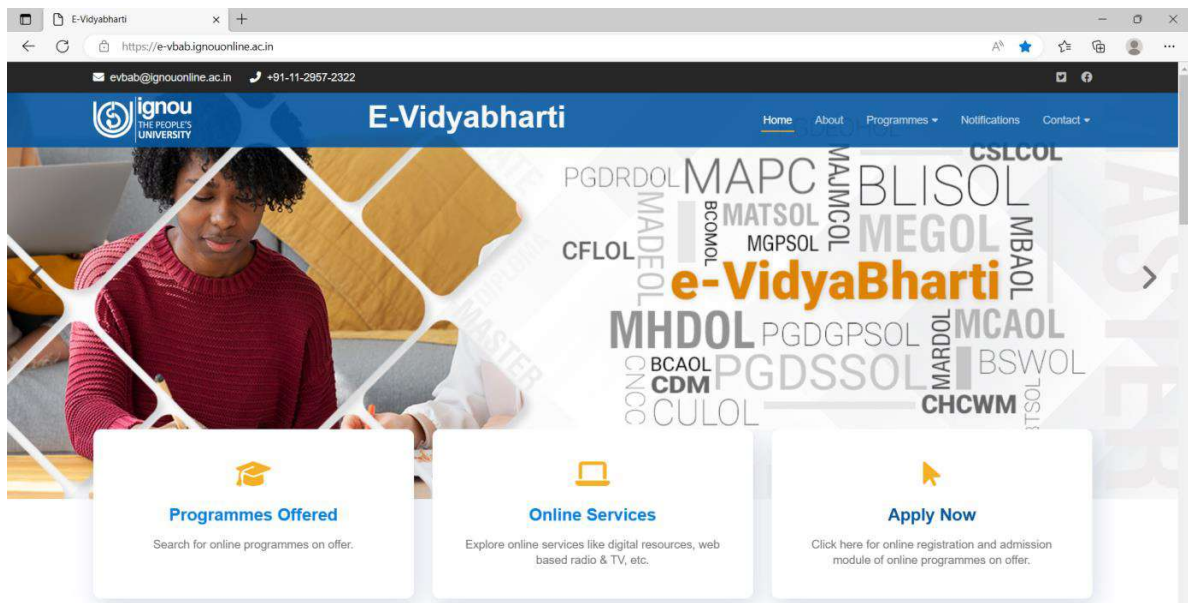


Figure 6: Home page of eVidyaBharti portal.

4. BCAOL PROGRAMME SYLLABUS

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

4.1 Detailed Syllabus of BCAOL 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 BCAOL 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; monotonicity-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 constraints, 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 GoogleDoc (3 Sessions).

4.2 Detailed Syllabus of BCAOL 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 for 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 *#ifndef* 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 Unbuffered 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: Propositional 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 is 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 BCAOL 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, Object 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 an 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, Prim'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 Sort, 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 inC++

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 BCAOL 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.

Unit2: 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.

BLOCK2: 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.

BLOCK3: 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 Ports 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: Introduction to Algorithms Design

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 ($n \times n$) 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 BCAOL 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.

BLOCK2: 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.

BLOCK3: 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 Protocols

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 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, Bessel'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, RungeKutta (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.

BLOCK2: 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-mail 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 1 Credit

This lab course 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 BCAOL 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)

1 Credit

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

8 Credits

The objective of the BCAOL 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 BCAOL 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 match 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 BCAOL final semester project. The courses studied by the students during the BCAOL 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. ***Students may 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 BCAOL are 39 (including a Project Course) 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 weightage 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 and Term – End Examination

The main purpose of assignments is to test student's comprehension of learning the materials they receive from the University and also to help them get through the courses by providing feedback to them. The information given in the course materials should be sufficient for answering the assignments. However, as Computer Science is an ever-enhancing area, the students should make an attempt and work with extra reading material through websites. This will enhance your learning capabilities. Mostly the assignments are designed in such a way as to help you concentrate mainly on the course material, exploit their personal experiences and apply the knowledge gained from various sources.

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

If the learners copy the assignments, which is an important component of the online programme, such assignments will be awarded "zero" and such students will be directed to re-attempt the fresh assignments pertaining to the next year which will indirectly delay the award of degree by a semester/ year.

Evaluation for BCAOL

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 AssemblyLanguage 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 JavaProgramming	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 NetworkingManagement	4
	BCSL-063	Operating System Concepts and NetworkingManagement Lab	1
	BCSP-064	Project**	8

Note:

- Practical examination will be conducted for the lab courses only. The letter 'L' in the course code represents the lab course. Pass in each and every part in the practical course of Term-End Practical Examination is compulsory in order to get it declared successful in the respective course. The practical examination includes Viva Voce only.
- 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 Project Evaluation and (ii)Viva-voce.

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

For FEG-02:

<http://www.ignou.ac.in/ignou/aboutignou/school/soh/programmes/detail/683/2>

For ECO-01 and ECO-02:

<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 BCAOL:

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.

I) Evaluation Methodology of BCS-011, BCS-012, BCS-031, BCS-041, BCS-042, BCS-051, BCS-052, BCS-053, BCS-054, BCS-055, BCS-062, MCS-011, MCS-012, MCS-013, MCS-014, MCS-015, MCS-021, MCS-023, MCS-024, MCS-022

- 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: 100, Min. Marks 35, Weightage: 75% Duration of TEE: 3 hours

III) Evaluation Methodology of BCSL-013, BCSL-021, BCSL-022, BCSL-032, BCSL-033, BCSL-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%

IV) 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%

V) Evaluation Methodology of ECO-01, ECO-02, and FEG-02

- a) **Continuous Evaluation:** Max. Marks 100, Min.Marks: 35, Weightage: 30%
- b) **Term End Examination:** Max. Marks: 100, Min. Marks:35, Weightage: 70%, Duration of TEE: 3hours

VI) 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 interm 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 BCS-040, 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%

Award of Final Division:

The final division of a student is awarded as follows:

Marks Range	Division
75% and above	First Division with Distinction
60% or more but less than 75%	First Division
50% or more but less than 60%	Second Division
40% or more but less than 50%	Third Division

5.2 Instructions for Assignments

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

1. The word limits for answering most of the questions are mentioned with them. If no word limit is prescribed, then assume it to be 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. Also, use appropriate examples if any required in support of your answer. Use program code/diagram wherever required.
 - 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) 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 :.....
ONLINE ASSIGNMENT SUBMISSION	DATE :

3. Read instructions for submission of assignments given here. The assignments response sheets should be preferably handwritten. However, the software coding, snapshots, test-cases, etc. can be in the printed form. Students should not reproduce their answers from the content of the Units of the courses, as given on the LMS. If they reproduce from the Units, they will get poor marks for the respective question.
4. The students should write each assignment response separately. All the assignments should not be written in continuity in the same assignment response. **You must write page numbers on each page**
5. **The students should write the question number with each answer. Answer the question in sequential order. The submitted assignment is to be retained by the student for his or her own record and future reference, if any.**
6. The students should use only A4 size paper for their response and tag all the pages carefully. Avoid using very thin paper. Keep a 4-cm. margin on the left and at least 4 lines in between each answer.
7. *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.*
8. **The handwritten assignment response of a specific course should be scanned by a good scanner and sent to the email id specified for that course.** Student must make sure that the scanned assignment response is readable. **Under no circumstances should they be sent to the SED Division or the School at Headquarters, for evaluation.**

5.3 Guidelines Regarding 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. Students should download the latest assignment from the IGNOU/IGNOU's online programmes website.
3. 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.

4. IGNOU 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.
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 students.
6. For their own record, students should retain a scanned copy of all the assignment responses, which they submitted.
7. As per the University norms, once the student's scores pass marks in an assignment, they cannot 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, so that the correct score to the SED at the Headquarters.
- 10 The students should not enclose or express doubts for clarification, if any, along with the assignments. They should send their doubts in a separate email. While doing so they should give their complete Enrolment number, name, address, programme code.

Note: Please submit your duly scanned Assignment response on or before the due date at the specified email ID.

11. In case, you have not successfully completed an assignment, you should resubmit the assignment, if your registration for that course is valid.
12. Assignments should not be resubmitted to improve your score if you have secured minimum qualifying score in a course.
13. Please do not submit your assignment responses twice.
14. There is no provision for reevaluation of Assignments, practical examination and project evaluation.

Note: Please submit your Assignments on or before the due date at the specified email ID.

5.4 General Guidelines Regarding the Term-End Examination

Please refer the Announcements section in the online portal.

<https://iop.ignouonline.ac.in/announcements/0>

6. OTHER USEFUL INFORMATION

6.1 Procurement of Official Transcripts

The University provides the facility of obtaining official transcripts on request, made by the learners in prescribed application form for official transcript, which provides details of fee, where to apply etc. Link to this form is given in the Section 9.

6.2 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 application form for Duplicate Grade card, which provides details of fee, where to apply etc. Link to this form is given in the Section 9

6.3 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>

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 Nodal Regional Center for advance / timely / day-to-day information at bcaol@ignou.ac.in (If you are BCAOL student) and rcdelhi3@ignou.ac.in (If you are BCAOL student under e-VidyaBharati) 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 , MaidanGarhi New Delhi -110068, 011-29532741 (SRD), 1302 (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 , MaidanGarhi New Delhi -110068, Phone No: 011-29535828/2482 (SED), Phone No. 011-29572204/2205(SED), registrarsed@ignou.ac.in
(iii)	Assignments, Admission, Fees, Scholarship, Change of Course/Programme, Change of Address, Study Centre/ Regional Centre, Issuance of Bonafide Certificate, Migration Certificate, Duplicate Identity Card and Non-receipt of Self-learning/ Study Materials, Assignments etc.	Regional Director of concerned Nodal Regional Centre: IGNOU RC Delhi-1 IGNOU Regional Centre J-2/1, Block B-1 Mohan Cooperative Industrial Estate Mathura Road, New Delhi - 110044 Contact No.: 011-26990085, 011-26990089 Email: rcdelhi1@ignou.ac.in , bcaol@ignou.ac.in
(iv)	Academic Matters	BCAOL Programme Coordinator SOCIS, C-Block, New Academic Complex IGNOU, MaidanGarhi, New Delhi - 110 068 Phone No. 011-29572902, Email: bcaolsocis@ignou.ac.in
(v)	Issue of Degree/Diploma/Certificate, Dispatch of returned Degrees, verification of Degree	Dy. Registrar (Exam-I) Examination –I Indira Gandhi National Open University, MaidanGarhi New Delhi -110068, Phone No.011-29535438 Intercom No.2224/2213 e-mail exam1@ignou.ac.in
(vi)	Issue of Provisional Certificates and Grade Cards	Dy Registrar (Exam-3) Phone No: 011-29536743; Intercom No. 2201
(vii)	Declaration of pending results of TEE, Incorporation of practical marks, Verification of provisional certificate and grade card, Issue of transcripts	Dy. Registrar (Exam-3) Phone No: 011-29536103/6743 011-29572201/2211
(viii)	Non incorporation of assignment marks	Assistant Registrar (Assignment) Phone No: 011-29532294 Intercom No. 1319/1325 E-mail: assignments@ignou.ac.in
(ix)	Online students grievances Portal	http://igram.ignou.ac.in/
(x)	Students General Enquiries	Student Support Centre Indira Gandhi National Open University, MaidanGarhi New Delhi -110068, Phone: 011-29535714, 29572512, 29572514, 29533869 and 29533870 e-mail : ssc@ignou.ac.in

Telephone numbers of the Divisions/ Schools are also provided on the website under the “Contact Us” option. Students are advised to be in touch with their Regional Centre/Study Centre for advance/timely/day-to-day information or visit the website with URL www.ignou.ac.in.

8. PATTERN OF QUESTION PAPERS

TERM-END EXAMINATION FOR COURSES OF ONLINE PROGRAMMES

Question Paper Sample

Sl. No.	Characteristics	No. of Questions to be set	No. of questions to be attempted by the Student	Maximum marks for each question	Total Marks
1.	Short Answer	07	05	04	5X4=20
2.	Medium Answer	07	05	10	5X10=50
3.	Long Answer	03	02	15	2X15=30
	Total	17	12		

N.B. 12 questions will be required to attempt by the students out of total 17 question set in a question paper.

9. LINK TO FORMS AND ENCLOSURES

In this section, we are enclosing the IGNOU website links to various forms, which are useful for you. Whenever you have to correspond with the university, please download the form from the Website and fill it carefully and send as per instructions therein. The detailed instructions for all these-forms are provided in form itself. Some of these links may change, in those cases please use search option to find the desired link.

Note: You must Download the Forms from the Website

Forms and Useful links

- **Link to Application form for Improvement of Division/Class**
<http://www.ignou.ac.in/userfiles/Improvement%20form.pdf>
- **Link to form for Duplicate Grade Card/Mark-sheet**
<http://www.ignou.ac.in/userfiles/Duplicate%20mark%20sheet%20form.pdf>
- **Link to form for Issue of Official Transcript**
<http://www.ignou.ac.in/userfiles/Official%20Transcript%20form.pdf>
- **Link to form for Issue of Migration Certificate**
<http://ignou.ac.in/userfiles/Migration%20Certificate.pdf>

Re-registration

- **[Link to Online Re-Registration for proceeding to subsequent semester.](https://onlinerr.ignou.ac.in/)**

Last date of Re-Registration is announced on the IGNOU website. In general, the re-registration is to be done 2-3 months prior to the start of session.