Education and Training Division
Assam Electronics Development Corporation Limited
Industrial Estate, Bamunimaidam
Guwahati – 781021

Revised Outline Syllabi of AMTRON Courses

To Run in AMTRON Centres/ AMTRON Authorised Franchisee Centres
(Revised in September 2022 and May 2023)
[References: E&T Division, AEDC Ltd. (AMTRON) Notifications with
Ref. No. AEDC/E&T/GHY/ACADCOM/2017/29/484 Dated 30-09-2022,
Ref. No. AEDC/E&T/GHY/ACADCOM/2017/29/543 Dated 15-03-2023,
Ref. No. AEDC/E&T/GHY/ACADCOM/2017/29/549 Dated: 24-03-2023 and
Ref. No. AEDC/E&T/GHY/ACADCOM/2017/29/564 Dated: 08-05-2023]
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List of Revised Courses:

- Computer Awareness Course (CAC)
- Basic Digital Literacy Programme (BDLP)
- **Certificate Courses in -**
  - Computer Application (CCA)
  - Computer Hardware and Networking (CCHN)
  - Multimedia and Animation Technology (CMAT)
  - Internet and Web Technology (CIWT)
  - C++ Programming Language (CCPL)
  - Programming using Python Language (CPPL)
  - Web Application Development using LAMP (CWADL)
  - Desktop Publishing (CDTP)
  - Accounting using Tally (CAT)
  - Internet of Things (CIoT)
  - Object Oriented Programming using Java (COOPJ)
- **Professional Diploma Courses in -**
  - Web Knitting Technology (PDWKT)
  - Computer Application (PDCA)
- **Diploma Course in -**
  - Computerised Office Automation (DCOA)
  - Computer Application (DCA)
  - Industrial Accountancy (DIA)
  - Multimedia and Animation Technology (DMAT)
  - Computer Hardware and Networking (DCHN)
- **Advanced Diploma Course in -**
  - Computer Application (ADCA)
- **Post Graduate Diploma Course in -**
  - Computer Science and Application (PGDCSA)

Paper Structures in the Revised Courses:

Sl. No.	Course Code	Revised Paper Code & Paper Name
1	CAC	**ET-CAC:** Basic Computer Tools
2	BDLP	**ET-BDLP:** Basic Digital Applications
3	CCA	**ET-CA-01:** Introduction to ICT Tools

4	CCHN	**ET-CA-21:** Introduction to ICT Resources
5	CMAT	**ET-CA-22:** Multimedia and Animation Technology
6	CIWT	**ET-CA-03:** Internet and Web Technology
7	CCPL	**ET-CA-41:** Object-Oriented Programming through C++ Language
8	CPPL	**ET-CA-42:** Programming and Problem Solving though Python Language
9	CWADL	**ET-CA-08:** Web Application Development using LAMP
10	CDTP	**ET-CA-09:** Desktop Publishing
11	CAT	**ET-CA-10:** Financial Accounting using Tally and Excel
12	CIoT	**ET-CA-12:** Internet of Things and its Applications
13	COOPJ	**ET-CA-13:** Object Oriented Programming using Java
14	PDWKT	**ET-CA-03:** Internet and Web Technology
		ET-CA-08: Web Application Development using LAMP
		ET-CA-PJ1: Mini Project
15	PDCA	**ET-CA-01**: Introduction to ICT Tools
		ET-CA-11: DTP & Financial Accounting
16	DCOA	**Semester 1:**
		ET-CA-01: Introduction to ICT Tools
		ET-CA-11: DTP & Financial Accounting
		Semester 2:
		ET-OA-03: Office Management & Secretarial Services
		ET-OA-04: Basic Online Applications and Google Workspace
		ET-OA-PJ: Mini Project & Seminar
17	DCA	**Semester 1:**
		ET-CA-01: Introduction to ICT Tools
		Any one of these two: **ET-CA-21**: Introduction to ICT Resources
		ET-CA-22: Multimedia and Animation Technology
		Semester 2:
		ET-CA-03: Internet and Web Technology
		Any one of these two: **ET-CA-41**: Object-Oriented Programming through C++ Language
		ET-CA-42: Programming and Problem Solving though Python Language
		ET-CA-PJ1: Mini Project (100 Marks)
18	DIA	*Semester 1:*
		ET-CA-01: Introduction to ICT Tools
		ET-IA-02: Accounting & Taxation
		Semester 2:
		ET-IA-03: Computerised Accounting using Tally

		ET-IA-04: Personality and Soft Skills Development
		ET-IA-PJ: Mini Project/ Apprentice (100 Marks)
19	DMAT	***Semester 1:***
		ET-CA-01: Introduction to ICT Tools
		ET-MT-02: Introduction to Multimedia
		Semester 2:
		ET-MT-03: Multimedia Processing Techniques
		ET-MT-04: Multimedia Design Principles and Applications
		ET-MT-PJ: Mini Project (100 Marks)
20	DCHN	***Semester 1:***
		ET-HN-01: Basics of Computer Hardware
		ET-HN-02: Peripherals and Data Storage Devices
		ET-HN-03: Computer Networking and Hardware
		Semester 2:
		ET-HN-04: Working and Maintenance of Systems
		ET-HN-05: Basic Employability Skills
		ET-HN-OJT: On-the-job training (100 Marks)
21	ADCA	**Semester 1:**
		ET-CA-01: Introduction to ICT Tools
		Any one of these two: **ET-CA-21**: Introduction to ICT Resources / **ET-CA-22**: Multimedia and Animation Technology
		ET-CA-11: DTP & Financial Accounting
		Semester 2:
		ET-CA-03: Internet and Web Technology
		Any one of these two: **ET-CA-41**: Object-Oriented Programming through C++ Language / **ET-CA-42**: Programming and Problem Solving though Python Language
		ET-CA-08: Web Programming using LAMP
		ET-CA-PJ1: Mini Project (100 Marks)
22	PGDCSA	**Semester 1:**
		ET-CA-01: Introduction to ICT Tools
		Any one of these two: **ET-CA-21**: Introduction to ICT Resources / **ET-CA-22**: Multimedia and Animation Technology
		ET-CA-03: Internet and Web Technology
		Any one of these two: **ET-CA-41**: Object-Oriented Programming through C++ Language / **ET-CA-42**: Programming and Problem Solving though Python Language
		ET-CA-PJ1: Mini Project (100 Marks)

Semester 2:		
ET-CA-05: Computer System Architecture		
ET-CA-06: Systems Concept & Introduction to Database Management		
ET-CA-07: Data Structure Using 'C++'		
ET-CA-08: Web Programming using LAMP		
ET-CA-PJ2: Major Project (200 Marks)		

Outline Syllabi:

1. ET-CAC: Basic Computer Tools

Objective:

The course is designed to aim at imparting a basic level appreciation programme for the common man. After completing the course the incumbent will be able to the use the computer for basic purposes of preparing his personnel / business letters

- Will be able to create data and basic operation with data using spreadsheet.
- Will be able to create and use basic presentation
- Will be able to view information on Internet (the web)
- Will be able to create email account and send / receive emails
- Will be able to use Digital Financial Services
- Will be able to use Social Media, e-Governance and their usage etc.

Duration:

40 Hours - (Theory: 16 hrs + Practical: 24 hrs)
This course can be offered as 20 days (One Month) part-time course.

Eligibility:

No minimum qualification is required for applying and appearing for the examination in Computer Awareness Course (CAC).

Outline of the Paper

Sl. No.	Chapter Name	Duration (Hours)	
		Theory	**Practical**
1	Chapter-1 Introduction to Computer	2	2
2	Chapter-2 Introduction to Operating System	2	2
3	Chapter-3 Word Processing	2	4
4	Chapter-4 Working with Spreadsheet	2	4
5	Chapter-5 Creating Presentations	2	3
6	Chapter-6 Introduction to Network & Internet	2	3
7	Chapter-7 E-mail, Social Networking and e-Governance Services	2	3
8	Chapter-8 Digital Financial Tools and Applications	2	3
	Total:	16	24

Note: For practical purpose latest version of Free Open Source Ubuntu & LibreOffice may be used.

RECOMMENDED BOOKS

1. P.K. Sinha and P. Sinha, " Foundations of Computing" , BPB Publication, 2008.
2. LibreOffice, Getting Started Guide by LibreOffice Documentation Team.
3. OpenOffice.org for DUMMIES by Gurdy Leete, Ellen Finkelstein and Mary Leete.

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2. ET-BDLP: Basic Digital Applications

Objective:

The course is designed to equip a person to use computers for professional as well as day to day use. It provides theoretical background as well as in depth knowledge of Software/ packages. After completing the course the incumbent will be digitally literate and will be able to:

- Acquire confidence in using computers in Office and General Life;
- Will be able to identify the basic components of computers and terminology;
- Understand file management;
- Create documents using word processor, spreadsheet & presentation software;
- Understand computer networks, and browse the internet, content search, email and collaborate with peers;
- Use e-Governance applications; and use computer to improve existing skills and learn new skills
- Understanding Social Networking platform
- Using internet for Digital Financial services
- Develop knowledge about Futureskills

Duration:

80 Hours - (Theory: 32 hrs + Practical: 48 hrs)
This course can also be offered as 40 days (Two Months) part- time course.

Eligibility:

No minimum qualification is required for applying and appearing for the examination in BDLP.

Job Role:

Computer Operator, Data Entry Operator and Social Media Operator

Outline of the Paper:

Sl. No.	Chapter Name	Duration (Hours)	
		Theory	**Practical**
1	Chapter-1 Introduction to Computer	3	3
2	Chapter-2 Introduction to Operating System	3	4
3	Chapter-3 Word Processing	4	8
4	Chapter-4 Spread Sheet	4	8
5	Chapter-5 Presentation	4	8
6	Chapter-6 Introduction to Internet and WWW	3	4
7	Chapter-7 E-mail, Social Networking and e-Governance Services	3	6
8	Chapter-8 Digital Financial Tools and Applications	4	4
9	Chapter-9 Overview of Futureskills & Cyber Security	4	3
	Total:	**32**	**48**

Note: For practical purpose latest version of Free Open Source Ubuntu & LibreOffice may be used.

RECOMMENDED BOOKS
1. P.K. Sinha and P. Sinha, " Foundations of Computing" , BPB Publication, 2008.
2. LibreOffice, Getting Started Guide by LibreOffice Documentation Team.
3. OpenOffice.org for DUMMIES by Gurdy Leete, Ellen Finkelstein and Mary Leete.
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3. ET-CA-01: Introduction to ICT Tools:

Objective of the Paper:

   The goal of this course is to present overview of Information and Communication Technology (ICT) tools used in day to day use of computers and data base operations. The Course has been designed to provide knowledge on various hardware and software components of computer, operating system, various packages used for different applications, data base concepts & operations and various issues related to and application of ICT.

  At the end of the course the students will be able to:-
- Acquire the foundation level knowledge required to understand computer and its operations.
- Understand the hardware and software components of the computer.
- Understand the basic concept of operating system and get knowledge about various different operating systems.
- Understand to use the packages of word processing, spread sheet and presentation in detail.
- Understand various data base concepts and operations.
- Understand the issues related to ICT and ICT applications.

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Practical**
1	Computer Appreciation	04	04
2	Computer Organization	06	06
3	Operating System	12	12
4	Word Processing	05	05
5	Spreadsheet Package	08	08
6	Presentation Package	05	05
7	Data Base Operations	12	12
8	Computer Communication and Internet	04	04
9	Security Overview	02	02
10	Information Technology and Society	02	02
	Total:	**60**	**60**

RECOMMENDED BOOKS
MAIN READING
1. P.K. Sinha and P. Sinha, " Foundations of Computing" , BPB Publication, 2008.

2. Sagman S, "MS Office for Windows XP", Pearson Education, 2007.
3. ITL Educational Society, "Introduction to IT", Pearson Education, 2009.
4. Miller M, "Absolute Beginners Guide to Computer Basics", Pearson Education, 2009.
5. LibreOffice, Getting Started Guide by LibreOffice Documentation Team.
6. OpenOffice.org for DUMMIES by Gurdy Leete, Ellen Finkelstein and Mary Leete.

SUPPLEMENTARY READING
1. Turban, Mclean and Wetherbe, "Information Technology and Management" John Wiely & Sons.
2. Mansfield Ron, "Working in Microsoft Office", 2008, Tata McGraw-Hill
3. Balagurusamy E, "Fundamentals of Computers", 2009, Tata McGraw-Hill
4. Mavis Beacon, "All-in-one MS Office" CD based views for self learning, BPB Publication, 2008
5. Perry G, "MS Office 2007", Pearson Education, 2008.
6. D'Suoza & D'souza, "Learn Computer Step by Step", Pearson Education, 2006.
7. Kulkarni, "IT Strategy for Business", Oxford University Press

Refer: Open Office/ LibreOffice/ MS Office Environment for practice.

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4. ET-CA-21: Introduction to ICT Resources

Objective of the Paper:

This course has been designed to provide an introduction to Computer Hardware and Networking troubleshooting & maintenance. The student will be able to troubleshoot problems of PC and replace the defected parts of the computer. Students will understand the basic networking concepts and they will be able to establish and manage small networks.

At the end of the course students will be able to:
- Assemble and disassemble a PC.
- Effectively use miscellaneous utilities such as: Compression, CD writing, Antivirus etc.
- Establish and configure a small LAN.
- Perform simple network administration operation.

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Practical**
1	PC Assembly and Operation	15	15
2	Miscellaneous Utilities	15	15
3	Networking Concepts	15	15
4	Network Administration	15	15
	Total:	**60**	**60**

RECOMMENDED BOOKS:

MAIN READING:
1. Scott and Mueller, "Upgrading and Repairing PCs", Techmedia, New Delhi
2. Troubleshooting, Maintenance and Repairing PCs, Fifth Edition, by Stephen J. Bigelow, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. PC Upgrade and Maintenance Guide, 15 th Edition, by Marks Minasi, BPB Publications

4. Basic of Networking. "NIIT", Prentice, Hall of India Private Limited.
5. Networking Protocols and Standards. "NIIT", Prentice, Hall of India Private Limited.
6. William Stallings, "Data and Computer Communication", Prentice, Hall of India Private Limited.
7. D. Balasubramanian, "Computer Installation and Servicing", Tata McGraw-Hill

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5. ET-CA-22: Multimedia and Animation Technology

Objective of the Paper:
        This paper aims to introduce the fundamental elements of multimedia. It will provide an understanding of the fundamental elements in multimedia. The emphasis will be on learning the representations, perceptions and applications of multimedia. Software skills and hands on work on digital media will also be emphasized. On completion of the subject, the students will understand the technologies behind multimedia applications and master the skills for developing multimedia projects. After successfully completing the module student should be able to:
     • Summarize the key concepts in current multimedia technology.
     • Create quality multimedia software titles.

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Practical**
1	Introduction to Multimedia	08	08
2	Computer Fonts and Hypertext	10	10
3	Audio fundamentals and representations	10	10
4	Image Fundamentals and representations	10	10
5	Video and Animation	10	10
6	Multimedia Authoring	12	12
	Total:	**60**	**60**

RECOMMENDED BOOKS
MAIN READING
1. Tay Vaughan, "Multimedia making it work", Tata McGraw-Hill, 2008.
2. Rajneesh Aggarwal & B. B Tiwari, " Multimedia Systems", Excel Publication, New Delhi, 2007.
3. Li & Drew, " Fundamentals of Multimedia" , Pearson Education, 2009.

SUPPLEMENTARY READING
1. Parekh Ranjan, "Principles of Multimedia", Tata McGraw-Hill, 2007
2. Anirban Mukhopadhyay and Arup Chattopadhyay, "Introduction to Computer Graphics and Multimedia", Second Edition, Vikas Publishing House.

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6. ET-CA-03: Internet and Web Technology

Objective of the Paper:
        The aim of this course is to provide you the conceptual and technological developments in the field of Internet and web designing with the emphasis on comprehensive knowledge of Internet, its applications

and the TCP/IP protocols widely deployed to provide Internet connective worldwide. The World Wide Web with its widespread usefulness has become an integral part of the Internet. Therefore, this course also puts emphasis on basic concepts of web design.

At the end of the course the students will be able to: -

- Review the current topics in Web & Internet technologies.
- Describe the basic concepts for network implementation.
- Learn the basic working scheme of the Internet and World Wide Web.
- Understand fundamental tools and technologies for web design.
- Comprehend the technologies for Hypertext Mark-up Language (HTML).
- Specify design rules in constructing web pages and sites.
- Effectively deal with programming issues relating to VB Script, JavaScript, Java, ASP, Front Page and Flash.
- Figure out the various security hazards on the Internet and need of security measures.

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Practical**
1	Introduction to Internet	02	02
2	TCP/IP – Internet Technology and Protocol	03	03
3	Internet Connectivity	03	03
4	Internet Network	04	04
5	Services on Internet	04	04
6	Electronic Mail	07	07
7	Current Trends on Internet	03	03
8	Web Publishing and Browsing	10	10
9	HTML Programming Basics	12	12
10	Interactivity Tools and Scripting languages	08	08
11	Internet Security, Information Privacy and Copyright Issues	04	04
	Total:	**60**	**60**

RECOMMENDED BOOKS
MAIN READING
1. Greenlaw R and Hepp E, "Fundamentals of Internet and www" , 2nd EL, Tata McGrawHill,2007.
2. Ivan Bayross, "HTML, DHTML, JavaScript, Perl CGI", 3 rd Edition, BPB Publications.
3. D. Comer, "The Internet Book", Pearson Education, 2009.

SUPPLEMENTARY READING
1. M. L. Young,"The Complete reference to Internet", Tata McGraw Hill, 2007.
2. Godbole AS & Kahate A, "Web Technologies", Tata McGrawHill,2008.
3. Jackson, "Web Technologies", Pearson Education, 2008.
4. B. Patel & Lal B. Barik, " Internet & Web Technology ", Acme Learning Publishers
5. Leon and Leon, "Internet for Everyone", Vikas Publishing House.

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7. ET-CA-41: Object-Oriented Programming through C++ Language

Objective of the Course:
By the end of this course, you will be able to:
- Read and write C++ code
- Use C++ interfaces and libraries
- Understand how to use object oriented design principles in the context of the C++ language
- Understand key concepts such as abstract interfaces, polymorphism, and data abstraction.

Learning Outcomes:
At the conclusion of this course, you should be able to:
- Understand object-oriented programming features in C++,
- Apply these features to program design and implementation,
- Understand object-oriented concepts and how they are supported by C++
- Gain some practical experience of C++
- Understand implementation issues related to object-oriented techniques,
- Build good quality software using object-oriented technique

Duration: 120 hours (Lectures: 60 hours+ Practical/Tutorials: 60 hours)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Practical**
1	Principles of Object Oriented Programming (OOP)	03	03
2	Elements of C++ Language	06	06
3	Functions	06	06
4	Classes and Objects	06	06
5	Constructors and Destructors	04	04
6	Operator Overloading	06	06
7	Derived Classes and Inheritance	06	06
8	Pointers	04	04
9	Virtual Functions	04	04
10	Streams	04	04
11	Exception Handling	03	03
12	Class Libraries	04	04
13	Advanced Classes	02	02
14	Testing and debugging simple programs	02	02
	Total:	**60**	**60**

Recommended Books
Main Reading:
1. S. B. Lippman, C++ Primer, Third Edition, 1998, Addision Wesely.
2. W. Savitch, Problem Solving with C++, Second Edition, 1999, Pearson Education.

Supplementary Reading:

1. R. Lafore, Object Oriented Programming in C++, Fourth Edition, 2001, Techmedia.
2. B. Stroustrup, The Elements of C++ Programming, Third Edition, 2000, Addison Wesley.
3. K. V. Venugopal, R.Kumar and T.Tavishankar, Mastering C++, First Edition, 1997. Tata McGraw Hill.

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8. ET-CA-42: Programming and Problem Solving though Python Language

Objectives of the Paper:

The objectives of this module are to make the beginners understand the programming language concepts like Data Types, Loops, Functions; Python Lists, Strings, Tuples, Dictionaries, Elementary Data Handling using Pandas, NumPy Arrays, Creating Forms etc.

After completion of this course the learner is expected to analyze the real life problem and write a program in Python to solve the problem. The main emphasis of the module will be on writing algorithm to solve problems and implement in Python. After completion of the module, the learner will be able to

- Draw flow charts for solving different problems
- Develop efficient algorithms for solving a problem
- Use the various constructs of Python viz. conditional, iteration
- Write programs making judicious use of Lists, Strings, Tuples, Dictionaries wherever required
- Manage data using Numpy
- Handle files and create Modules in Python

Duration: 120 Hours - (Theory: 48 hrs + Practical: 72 hrs)

Outline of the Paper

Module Unit	Duration in Hours	
	Theory	**Practical**
1. Introduction to Programming	2	3
2. Algorithm and Flowcharts to solve problems	6	9
3. Introduction to Python	2	3
4. Operators, Expressions and Python Statements	10	15
5. Sequence data types	6	9
6. Functions	10	15
7. File Processing	6	9
8. Modules	2	3
9. NumPy Basics	4	6
Total	**48**	**72**

Reference Books/ Study Material

1. Python Programming- A modular Approach (with Graphics, database, Mobile and Web Applications by Sheetal Taneja and Naveen Kumar, Pearson.
2. Python Network Programming Cookbook by Pradeeban Kathiravelu, Dr. M. O. Faruque Sarkar, PACKT.
3. Head First Python by Paul Berry, O'Reilly
4. Dive into Python by Mark Pilgrim, APress
5. Beginning Programming with Python Dummies by John Paul Meuller.
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9. ET-CA-05: Computer System Architecture

Objective of the Course:
Objective of the course is to familiarize students about hardware design including logic design, basic structure and behavior of the various functional modules of the computer and how they interact to provide the processing needs of the user. This subject mainly focuses on the computer hardware and system software. It aims to describe the following aspects—

- Building blocks of the computer
- Computer Design

Duration: 120 Hours - (Theory: 60 hrs + Practical: 60 hrs)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Tutorial**
1	Digital Components	11	11
2	Data Representation	05	05
3	Register Transfer & Micro Operations	05	05
4	Basic Computer Organization	05	05
5	Central Processing Unit	09	09
6	Computer Arithmetic	07	07
7	Input-Output Organization	09	09
8	Memory Organization	09	09
	Total:	**60**	**60**

RECOMMENDED BOOKS

MAIN READING:
1. Carter Nicholas, "Computer Architecture", Schaun outline Sevies , Tata McGraw-Hill, 2008.
2. M. Morris Mano, "Computer System Architecture", Pearson Education, 2008.

SUPPLEMENTARY READING
1. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
2. Michael J. Flynn, "Computer Architecture: Pipelined and Parallel Processor Design", Narosa Publishing House, 2002.00.

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10. ET-CA-06 : Systems Concept & Introduction to Database Management

Objective of the paper:

The module is designed to equip a person to understand System Analysis and Design aspects. It provides theoretical background as well as in depth knowledge through case studies. This module covers both structured and Object-oriented techniques to analyse and design software. It is also designed to equip a learner to acquire knowledge of the current trend and technologies of Databases.

After completing the module, the incumbent will be able to:

- Under the need of system analysis and design in software development
- Understand complete life cycle of System analysis and Design
- Do the feasibility analysis and design of the proposed system
- Use various analysis and design tools and techniques
- Get familiar with Object oriented System Design
- Understand the role of testing in software development
- Understand Database design using Normalization and E-R modelling
- Use Standard Query Language and its various versions.
- Understand importance of backup and recovery techniques.
- Develop Database System to handle real world problem.

Duration: 120 Hours - (Theory: 60 hrs + Practical: 60 hrs)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Tutorial**
	Section A: Systems Concept		
1	System Development Cycle	03	03
2	System Planning	05	05
3	Modular and Structured Design	02	02
4	Input/Output and Interface Design	05	05
5	System Implementation and Maintenance	03	03
6	OO Analysis / Design	07	07
	Section B: Introduction to Database Management		
7	An Overview of the Database Management System	04	04
8	An Architecture of the Database system	04	04
9	Relational Database Management System (RDBMS)	06	08
10	Relational Algebra and Relational Calculus	06	08
11	The SQL Language	10	10
12	Backup and Recovery	02	02
13	Computer System Security	02	02
14	Integrity	01	01
	Total:	**60**	**60**

RECOMMENDED BOOKS

MAIN READING

1. Hoffer J. A, George J.F, Valacich J.S, and Panigrahi P.K "Modern Systems Analysis and Design", Pearson Education, 2007.
2. A. Dennis and B. H. Wixom, "Systems Analysis and Design", John Wiley & Sons, Inc.
3. R. Elmasri, S. B Navathe, " Fundamentals of Database System", Pearson Education, 2007.
4. Desai C. Bipin, "An Introduction to Database Systems", Galgotia Publication, 2009.

SUPPLEMENTARY READING

1. Whitten J. L, Bentley L. D, "Systems Analysis and Design Methods", Tata McGraw- Hill, 2008.
2. Kendall & Kendall, "Systems Analysis and Design", Seventh Edition, Pearson Education.
3. Leon A and Leon M, "Fundamentals of DBMS", Vijay Nicole & Tata McGraw-Hill, 2007.
4. Singh S.K, "Database Systems: Concepts, Design & Applications", Pearson Education, 2008.
5. Leon A and Leon M, "Database Management Systems", Vikas Publishing House.

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11. ET-CA-07: Data Structure Using 'C++'

Objective of the Course:

   The objective of the course is to introduce the fundamentals of Data Structures, Abstract concepts and how these concepts are useful in problem solving.

   After completion of this course student will be able to -

- Analyze step by step and develop algorithms to solve real world problems.
- Implementing various data structures viz. Stacks, Queues, Linked Lists, Trees and Graphs.
- Understanding various searching & sorting techniques.

Duration: 120 Hours - (Theory: 60 hrs + Practical: 60 hrs)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory	**Practical**
1	Analysis of Algorithm	10	10
2	Elementary Data Structures: Arrays, linked lists	18	18
3	Abstract Data types Stacks and Queues	05	05
4	Trees	12	12
5	Searching, sorting and Complexity	10	10
6	Graphs	05	05
	Total:	**60**	**60**

RECOMMENDED BOOKS :
MAIN READING:

1. Hubbard John. R, "Schaum's outline of Data Structures with C++", Tata McGraw-Hill, 2007.
2. Langsam Y,.Augenstein M.J and Tanenbaum A. M, "Data Structures Using C and C++", Second Edition, Pearson Education, 2007.
3. Kruse R, Tonodo C.L. and Leung B, "Data Structures and Program Design in C", Pearson Education, 2007.

SUPPLEMENTARY READING :

1. Horowitz E, Sahni S and Mehta D, "Fundamentals of Data Structures in C++," Galgotia Publiction, 2009.

2. Weiss M A, "Data Structures and Algorithm Analysis in C++", Pearson Education, 2007.

3. Litvin G, "Programmking with C++ and Data Structures", Vikas Publishing House.

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12. ET-CA-08: Web Programming using LAMP

1. Course Objectives:
- To be able to develop web application using open source technologies
- To learn PHP scripting language and deploying application on Apache Web Server
- To learn Apache Web Server configuration
- To learn MySQL database deployment for web applications

2. Prerequisites: Knowledge of Internet, HTML, JavaScript, LINUX, CSS and Database Concepts

Duration: 120 Hours - (Theory: 60 hours + Practical: 60 hours)

Outline of the Paper

Sl. No.	Topics	Duration (in hours)	
		Theory	**Practical**
1	Installation and Configuration of Apache, PHP & MySQL in Linux Environment	02	02
2	PHP Overview Flow control and building blocks	04	04
3	Working with Functions, Arrays and Objects	05	05
4	Working with Forms	02	02
5	JavaScript	05	05
6	Interacting with MySQL	05	05
7	Working with Cookies, User Sessions, Files, Directories and Images	07	07
8	JSON	05	05
9	Site Security	04	04
10	PEAR and PECL	03	03
11	Code Efficiency	04	04
12	PHP Extensions	03	03
13	AJAX	04	04
14	Caching Engines	03	03
15	Content Management Systems	04	04
	Total:	**60**	**60**

RECOMMENDED BOOKS:

TEXT BOOKS:

1. Julie C Meloni, "Sams Teach Yourself PHP, MySQL and Apache All in One" 4th edition, Pearson Education

2. Jeremy McPeak Beginning JavaScript Wrox Publication

3. Sharanam Shah, Vaishali Shah, "LAMP Programming For Professionals", SPD, 2010

REFERENCE BOOKS:
1. James Lee and Brent Ware, "Open source web development with LAMP", Pearson Education
2. Jason Gerner, Morgan Owens, Elizabeth Naramore, Matt Warden, "Professional LAMP: Linux, Apache, MySQL and PHP5 Web Development" WROX publication
3. PHP6 and MySQL Bible –Steve Suehring, Tim Converse and Joyce Park – Wiley India Edition.
4. PHP and MySQL Web Development – Luke Welling, Laura Thomson – Pearson
5. Beginning Ajax with PHP From Novice to Professional, By Lee BabinApress
6. Head First AJAX by Rebecca Riordan , O'Reilly Media
7. Head First PHP& MySQL by Lynn Beighley, Michael Morrison, O'Reilly Media
8. Head First jQuery by Ryan Benedetti and Ronan Cranley, O'Reilly Media
9. Learning jQuery By Jonathon chaffer and Karl Swedberg, O'Reilly Media

List of Software/Learning Websites:
1. http://www.codecademy.com/learn
2. https://www.udemy.com/learn-html5-programming-from-scratch/
3. http://www3schools.com
4. http://www.tutorialspoint.com/ajax/
5. http://www.tutorialspoint.com/jquery/
6. http://www.tutorialspoint.com/php

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13. ET-CA-09: Desktop Publishing

Objective of the Paper:

The goal of this course is to present overview of DTP and Computerised Accounting tools used in day to day use of computers in Offset press/ Industry use. The Course has been designed to provide knowledge on various hardware and software components of computer used in Offset press.

At the end of the course the students will be able to:-
- Use a Page Layout Software like Pagemaker or Scribus for designing pages
- Use an Image Manipulation Software like Adobe Photoshop or GIMP Image Editor for editing photos.
- Use a Vector Graphics Software like Corel Draw, Inkscape, or LibreOffice Draw for drawing vector graphics.
- Use a Bilingual Software for typing documents in Assamese or any other regional language.

Total Duration: 120 (Lectures: 55 + Practical/Tutorials: 65**)**

Outline of the Paper

S. No.	Topic	Minimum number of hours	
		Theory	**Practical**
1	Introduction to Publishing	06	06
2	Document Development	03	03
3	Word Processing	05	07
4	Page Layout Software	09	10
5	Image Manipulation Software	09	10
6	Vector Graphics Software	09	10
7	Bilingual Software (for Assamese Typing)	02	07

8	Introduction to Web Publishing	04	04
9	Introduction to Printing Technology	08	08
	Total:	**55**	**65**

RECOMMENDED BOOKS

MAIN READING
1. P.K. Sinha and P. Sinha, " Foundations of Computing" , BPB Publication, 2008.
2. VK Jain, "'O' Level Module M3.2 – Desktop Publishing & Presentation Graphics", BPB Publication, 2001
3. Joan Lambert and Joyce Cox, "Microsoft® Word 2013 Step by Step", Microsoft Press
4. ITL Educational Society, "Introduction to IT", Pearson Education, 2009.
5. Miller M, "Absolute Beginners Guide to Computer Basics", Pearson Education, 2009.
6. LibreOffice, Getting Started Guide by LibreOffice Documentation Team.
7. OpenOffice.org for DUMMIES by Gurdy Leete, Ellen Finkelstein and Mary Leete.
8. Adobe Creative Team, "Adobe PageMaker 7.0 Classroom in a Book", Paperback – 1 January 2002,
9. Greg Bowden, "Learning Adobe PageMaker 7.0", Guided Computer Tutorials, 2002
10. "Mastering Photoshop" (English, Paperback, WebTech Sol.)
11. Bittu Kumar, "Adobe Photoshop paperback | ENGLISH", Comprehensive Computer Learning
12. Gary David Bouton, "CorelDRAW X7: The Official Guide"
13. Satish Jain, "Corel Draw Training Guide Paperback – 1 January 2018", BPB Publications
14. Helmut Kipphan, "Handbook of Print Media – Technologies and Production Methods", Springer, 2001

SUPPLEMENTARY READING
1. Vishnu Priya Singh, Meenakshi Singh, "DTP Course Book", Computech Publications Ltd.
2. Scribus DTP Software Tutorial: https://www.lifewire.com/scribus-software-tutorials-1078942
3. GNU Image Manipulation Program User Manual
4. GIMP Tutorials: https://www.gimp.org/tutorials/
5. Inkscape Tutorials: https://inkscape.org/learn/tutorials/
6. LibreOffice Draw - Learning to Design:
Https://www.edu.xunta.gal/espazoAbalar/sites/espazoAbalar/files/datos/1426066131/contido/
LibreOffice%20Draw/Draw%20-%20Carpeta%20autocontenida/Draw/intro.html

Refer: Open Office/ LibreOffice/ MS Office Environment for Word Processing practice.

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14. ET-CA-10: Financial Accounting using Tally and Excel

Objective of the Course:

The objective of the course is to develop some skilled person among the community. On successful completion of the programme, the students will be enabled to effectively use Tally and Excel for the purposes of financial accounting.

Total Duration: 120 (= Lectures: 55 + Practical: 65)

Outline of the Paper

Sl. No.	Topic	Minimum number of hours	
		Theory	**Practical**
1	Introduction to Accounting and its Theory	05	---
2	Basic Accounting Theories	05	---
3	Recording of Transactions	10	---
4	Tally	20	40
5	Spreadsheet Package (Excel)	15	25
	Total:	**55**	**65**

Recommended Books:

1. Vikas Gupta, "Comdex Tally.ERP 9 Course Kit with GST and MS Excel", Dreamtech Press India Pvt. Ltd
2. Gaurav Agrawal, "Learn Tally Prime With GST"
3. P. H. Bassett, Computerised Accounting, BPB Publication
4. T. S. Grewal, Double Entry Book Keeping, Sultan Chand
5. A. K. Nadhani & K. K. Nadhani, Implementing Tally ERP 9, BPB Publication
6. A. K. Nadhani & K. K. Nadhani, Implementing Fact Accounting for Widows, BPB Publication
7. Curtis D. Frye, "Microsoft® Excel 2007 Step by Step", Microsoft Press

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15. ET-CA-11: DTP & Financial Accounting

Objective of the Paper:

The goal of this course is to present overview of DTP and Computerised Accounting tools used in day to day use of computers in Offset press/ Industry use. The Course has been designed to provide knowledge on various hardware and software components of computer used in Offset press and maintaining Accounting in an Industry.

At the end of the course the students will be able to:-
- Use a Page Layout Software like Pagemaker or Scribus for designing pages
- Use an Image Manipulation Software like Adobe Photoshop or GIMP Image Editor for editing photos.
- Use a Vector Graphics Software like Corel Draw, Inkscape, or LibreOffice Draw for drawing vector graphics.
- Use a Bilingual Software for typing documents in Assamese or any other regional language.
- Use an Accounting Software like Tally ERP9 or GNU Cash.

Outline Of The Paper

Sl. No.	Topic	Minimum number of hours	
		Theory	**Practical**
	Block A: Desktop Publishing		
1	Page Layout Software	09	09
2	Image Manipulation Software	09	09

3	Vector Graphics Software	09	09
4	Bilingual Software (for Assamese Typing)	03	03
	Financial Accounting (using Tally)		
5	Fundamental of Accounting	05	-
6	Tally ERP 9 / GNU Cash	25	30
	Total:	**60**	**60**

RECOMMENDED BOOKS:

1. Vishnu Priya Singh, Meenakshi Singh, "DTP Course Book", Computech Publications Ltd.
2. Scribus DTP Software Tutorial: https://www.lifewire.com/scribus-software-tutorials-1078942
3. GNU Image Manipulation Program User Manual
4. GIMP Tutorials: https://www.gimp.org/tutorials/
5. Inkscape Tutorials: https://inkscape.org/learn/tutorials/
6. LibreOffice Draw - Learning to Design:
Https://www.edu.xunta.gal/espazoAbalar/sites/espazoAbalar/files/datos/1426066131/contido/LibreOffice%20Draw/Draw%20-%20Carpeta%20autocontenida/Draw/intro.html
7. B.B. Dam, R.A. Sarda, R. Barman, B. Kalita, Theory And Practice Of Accountancy, Capital Publishing Company
8. "Tally Power Of Simplicity- Tally.ERP 9 At A Glance", Tally Solutions Pvt. Ltd.
9. A. K. Nadhani & K. K. Nadhani, Implementing Tally ERP 9, BPB Publication
10. GnuCash Tutorial and Concepts Guide: https://code.gnucash.org/docs/C/gnucash-guide/

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16. ET-CA-12: Internet of Things and its Applications

Objective:

After completing the module, the learner will be able to:
- Understand how connected devices work together to update other applications.
- Acquire knowledge to interface sensors and actuators with microcontroller based Arduino platform.
- Writing C programs in Arduino IDE .
- Understand the Communication between microcontroller and PC using serial communication.
- Build IoT based applications and understand how data flows between things.
- Understand how electronic devices control electrical appliances working at 220v AC.
- Understand security aspect of IoT devices.
- Enhance skill set towards better personality development.

Prerequisites: Knowledge of C/ C++ Language Programming

Duration: 120 Hours - (Theory: 50 hrs + Practical: 70 hrs)

Outline of the Paper

Unit No.	Unit	Duration (in Hours)	
		(Theory)	(Practical)
1	Introduction to IoT – Applications/Devices, Protocols and Communication Model	6	8
2	Things and Connections	6	8

3	Sensors, Actuators and Microcontrollers	10	14
4	Building IoT Applications	22	32
5	Security and Future of IoT Ecosystem	6	8
	Total:	**50**	**70**

Use-case for building IoT based Applications
[Using Arduino and sensors/actuators]
  i. Interfacing Light Emitting Diode(LED)- Blinking LED : This use case will be used for familiarizing the GPIO peripheral of atmega micro controller. The LED will be used as a device and GPIO will work as output mode.
  ii. Interfacing Button and LED – LED blinking/glow when button is pressed This use case will help to understand the GPIO in two different modes, Input - Button and LED - output mode.
  iii. Interfacing Light Dependent Resistor (LDR) and LED, displaying automatic night lamp.
      This use case will help to understand ADC peripheral and how to read analog data from sensors.
  iv. Interfacing Temperature Sensor(LM35) and/or humidity sensor (e.g. DHT11) This use case will help to connect traditional environmental monitoring sensors (Temperature and humidity) to the Arduino development board. Also use the suitable libraries for implementing these case studies.
  v. Interfacing Liquid Crystal Display(LCD) – display data generated by sensor on LCD This case study will demonstrate how to provide local display unit with Arduino micro controller. Use suitable libraries for implementing these case studies.
  vi. Interfacing Air Quality Sensor-pollution (e.g. MQ135) - display data on LCD, switch on LED when data sensed is higher than specified value. This use case will help to understand how to use traditional smart pollution management sensors with Arduino platform for developing applications as a part of smart city projects.
  vii. Interfacing Bluetooth module (e.g. HC05)- receiving data from mobile phone on Arduino and display on LCD This use case will help to understand the connectivity solution to Arduino to a gadget like mobile phone. Bluetooth is used as connectivity solution in this application.
  viii. Interfacing Relay module to demonstrate Bluetooth based home automation application. (using Bluetooth and relay).
      This use case will enable the IoT node capability of Arduino development boards by integrating actuator (relay connected to GPIO) to Arduino board and remote connectivity (Using Bluetooth) using a mobile phone with the help of a readily available Bluetooth serial application.

Reference Books/Study Material:
  1. Macro Schwartz, "Internet of Things with Arduino- Cookbook", Packt 2016
  2. Arshdeep Bajga and Vijay Madisetti, "Internet of Things- A Hands-on Approach" Universities Press, 2014
  3. Massimo Banzi, "Getting started with Arduino", 2nd Edition, Oreilly, 2011 [Make:Makezine.com]
  4. Macro Schwartz, "Internet of Things with Arduino", Open Home Automation
  5. Michael Margolis, "Arduino Cookbook", Oreilly, 2011

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17. ET-CA-13: Object Oriented Programming using Java

Objective of the Course:
The course is designed to impart knowledge and develop skills required to solve real world problems using object oriented approach, Java Language constructs and Unified Modelling Language. This course covers the subject in 3 sections, viz, Introductions to Object Oriented Programming, Introduction to Java Programming Language, Introduction to UML.

After the completion of the course the student is expected to understand:

- Basics of Object Oriented Programming.
- Various Object Oriented programming concepts - Abstraction, Objects and Classes, Inheritance, Polymorphism.
- Basic data structures in Java, Objects and Classes , Super Class, sub-class, Interfaces, Inner classes.
- GUI programming using AWT/Swing.
- Deploying Java Applications.
- Accessing Databases in Java.
- What is unified Modeling Language and Why is it used.
- Using Class, Interface, Interaction, State and Activity, Physical diagrams in modeling software.

Duration: 120 Hours - (Theory: 60 hours + Practical: 60 hours)

Outline of the Paper

S. No.	Topics	Duration (in hours)	
		Theory	**Practical**
1	Introduction to Object Oriented Programming	14	14
2	Introduction to Java programming Language	32	32
3	Introduction to UML	14	14
	Total:	**60**	**60**

RECOMMENDED BOOKS

MAIN READING

1. Timothy Budo, ”An Introduction to Object-Oriented Programming with Java”, Pearson Education, 2009.
2. Martin Fowler,”UML Distilled: A Brief Guide to the Standard Object Modeling Language”, 3rd Edition, Pearson Education, 2009.

SUPPLEMENTARY READING

1. H. Schildt, “The Complete Reference -Java2”, Tata McGraw-Hill, 2008.
2. P. J Dietel and H. M Dietel, “Java How to Program”, 7th Edition, Pearson Education, 2008.
3. Grady Booch, James Rumbaugh, Ivar Jacobson, “Unified Modeling Language User Guide”, 2nd Edition, Pearson Education, 2009.
4. Wu C Thomas, “Introduction to Object Oriented Programming with Java”, 4th Edition, Tata McGraw-Hill, 2008.
5. Balaguruswamy E, “Programming with Java”, Tata McGraw-Hill, 2007.
6. Muthu C, “Essentials of Java Programming”, 2008, Tata McGraw-Hill, 2007.
7. Bhave M.P, Patekar S.A, “Programming with Java”, Pearson Education , 2009.
8. Khurana Rohit , “Object Oriented Programming with C++”, Vikas Publishing House.

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18. ET-IA-02: Accounting & Taxation

Objective:

After completion of the course students will get ideas on the rules regarding Income Tax, Sales Tax, VAT, GST etc., and will know to prepare the relevant necessary documents. Students will also get ideas on preparation of Payroll, Salary Statements and Pay Slips. Students will also get ideas on functions of Share Market and Equity Market.

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Outline of the Paper

Sl. No.	Topic	Duration in hours	
		Theory	**Practical/ Practice**
1	Manual Accounting.	10	10
2	Definition of 'Accounting Manual'	2	2
3	Contents of accounting manual	8	8
4	Meaning of auditing.	2	2
5	Objectives of auditing	3	3
6	Errors and frauds	8	8
7	Audit Procedure	4	4
8	Audit report	2	2
9	Recent trends in auditing	5	5
10	Share and stock	6	6
11	Duties & Taxes	10	10
	Total:	**60**	**60**

Suggested Readings:

1. Taxation- Vinod Kr. Singhania, Taxmann Publication, New Delhi.
2. Official publication of national institute of Financial Planning, New Delhi.
3. Official Publication of CBDT, New Delhi.
4. B.B. Lal: Direct Taxes, Income Tax, Wealth Tax and Tax Planning; Pearson Eduction, New Delhi.
5. Ahuja, Girish and Gupta, Ravi, Systematic Approach to Income Tax, Bharat Law House, Delhi
6. Gitman and Joehnk, Fundamentals of Investing, Pearson.
7. Chandra, Prasanna, Investment Analysis and Portfolio Management, Tata McGraw Hill.

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19. ET-IA-03: Computerised Accounting using Tally

Objectives:

The objective of the course is to develop some skilled person among the community. On successful completion of the programme, the students will be enabled to effectively use Tally for the purposes of financial accounting.

Duration: 120 hours (Lectures: 50 hours+ Practice/ Practicals: 70 hours)

Outline of the Paper

Sl. No.	Topic	Duration (in hours)	
		Theory/ Lectures	**Practice/ Practical**
A	Book Keeping	30	30
B	Tally	20	40
	Total:	**50**	**70**

RECOMMENDED BOOKS:
Main Reading:
1. Vikas Gupta, "Comdex Tally.ERP 9 Course Kit with GST and MS Excel", Dreamtech Press India Pvt. Ltd
2. P. H. Bassett, Computerised Accounting, BPB Publication
3. T. S. Grewal, Double Entry Book Keeping, Sultan Chand
4. A. K. Nadhani & K. K. Nadhani, Implementing Tally ERP 9, BPB Publication
5. A. K. Nadhani & K. K. Nadhani, Implementing Fact Accounting for Widows, BPB Publication

Supplementary Reading:
1. J.R. Monga, Company Accounts, Mayur Paperbacks
2. Shukla, Grewal and Gupta, Advance Accounts, Sultan Chand & Company
3. S.N. Maheswari, Financial Accounting, Vikash Publication
4. S.N. Maheswari, Problems & Solutions in Advanced Accountancy Vol. I, Vikash Publication
5. B.B. Dam, R.A. Sarda, R. Barman, B. Kalita, Theory and Practice of Accountancy, Capital Publishing Company

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20. ET-IA-04: Personality and Soft Skills Development

Objective:

After completion of the course students will be familiar with different aspects of personality, role of soft skills in personality development and some interview preparation techniques.

Duration: 120 hours (Lectures: 60 hours+ Practices: 60 hours)

Outline of the Paper

Sl. No.	Topic	Duration in hours	
		Theory	**Practice**
1	Introduction to Personality	10	10
2	Personality Determinants	12	12
3	Personality Development	13	13
4	Interpersonal and Group Skills	15	15
5	Interview Preparation	10	10
	Total:	**60**	**60**

Suggested Readings:

1. Hurlock, Elizabeth B, Personality Development, Tata McGraw Hill, New Delhi

2. McGrath, E.H., Basic Managerial Skills for All, Prentice Hall of India Pvt. Ltd., New Delhi

3. Wehtten, David A and Kim S Cameron, Developing Managerial Skills, Pearson Education, New Delhi

4. R.K. Mishra, "Personality Development", Rupa Publications

5. S.K.P. Selvam, "Personality Development", APH Publication Corporation

Note: Latest and additional good books may be suggested and added from time to time.
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21. ET-MT-02 : - Introduction to Multimedia

Objective:

The objective of this course is to provide concept about an application, which uses a collection of multiple media sources e.g. text, graphics, images, audio, animation and video. Students will learn about Multimedia, which is a field concerned with the computer-controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally.

Duration: (Lectures: 60 Hours, + **Practicals:** 60 Hours**)**

Outline of the Paper

Sl. No.	Topic	Minimum No. of Hours	
		Theory	**Practical**
1.	Introduction to Multimedia	08	08
2.	Representation of Multimedia Objects	20	20
3.	Concept of Multimedia Editing	10	10
4.	Introduction to Compression Technology	06	06
5.	Multimedia Application Design	06	06
6.	Multimedia Authoring and Publishing	10	10
	Total:	**60**	**60**

Reference:

MAIN READING
1. Tay Vaughan, "Multimedia making it work", Tata McGraw-Hill, 2008.
2. Rajneesh Aggarwal & B. B Tiwari, "Multimedia Systems", Excel Publication, New Delhi, 2007.
3. Li & Drew, "Fundamentals of Multimedia" , Pearson Education, 2009.

SUPPLEMENTARY READING
1. Parekh Ranjan, "Principles of Multimedia", Tata McGraw-Hill, 2007
2. Anirban Mukhopadhyay and Arup Chattopadhyay, "Introduction to Computer Graphics and Multimedia", Second Edition, Vikas Publishing House.

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22. ET-MT-03: - Multimedia Processing Techniques

Objective of the Course:

The objective of this course is to provide a basic knowledge about processing and editing of multimedia content with more emphasis on image processing. The students will be able to understand how to create, edit and modify the multimedia content using different software tools.

Duration: 120 Hours **(= Lectures:** 60 Hours + **Practicals:** 60 Hours**)**

Outline of the Paper

Outline of the Paper

Sl. No.	Topic	Minimum No. of Hours	
		Theory	**Practical**
1.	Introduction	02	02
2.	Digital representation of Color	02	02
3.	Image Capture	02	02
4.	Scanning	02	02
5.	Image Processing	04	04
6.	Scalable Vector Graphics (SVG)	02	02
7.	Introduction to MIDI	02	02
8.	Image Editing	20	20
9.	Image and Graphics Pattern Generation	10	10
10.	Sound Editing	06	06
11.	Video Editing	08	08
	Total:	**60**	**60**

Reference: Same as **ET-MT-02 : - Introduction to Multimedia**

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23. ET-MT-04: - Multimedia Design Principles and Applications

Objective of the Course:

This course will teach the use of visually rich and dynamic graphics elements to enhance web pages and sites. Advanced concepts in page layout and site optimization will be studied with emphasis on principles used to craft dynamic web pages that get noticed. Exercises and projects will allow students to apply the principles of web design to their own sites that will be created in the course.

Duration: (Lectures: 60 Hours, + **Practicals:** 60 Hours**)**

Outline of the Paper

Sl. No.	Topic	Minimum No. of Hours	
		Theory	**Practical**
1.	Design Overview	06	06
2.	Elements of Visual Design	12	12
3.	Human Computer Interface Design	10	10
4.	Information Architecture	08	08
5.	Animation Design	12	12
6.	Visual Effects	08	08
7.	Application Examples/ Case studies	04	04
	Total:	**60**	**60**

Reference:

MAIN READING:

1. Designing Interactive Systems: People, Activities, Contexts, Technologies, by David Benyon
2. Designing Visual Interfaces: Communication Oriented Techniques, by Kevin Mullet and Darrell Sano
3. Show Me the Numbers: Designing Tables and Graphs to Enlighten , by Stephen Few
4. An Introduction to Digital Multimedia by Terry Michael Savage and Karla E Vogel
5. Basics Animation: Digital Animation by Andy Chong
6. Envisioning Information by Edward R. Tufte
7. Thinking with Type: A Primer for Designers: A Critical Guide for Designers, Writers, Editors, & Students by Ellen Lupton
8. Design Basics by David Lauer, Stephen Pentak

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24. ET-HN-01: Basics of Computer Hardware

Objective:

On completion program the students will be able to understand the fundamentals of Computer Hardware, handling, testing & troubleshooting of personal computer problems.

Duration: 120 Hours (= Theory: 45 Hours + Practical: 75 Hours)

Outline of the Paper

Module Unit	Duration in Hours	
	Theory	**Practical**
1. Power Supplies	10	20
2. Mother Board	15	20
3. Chipset	5	10
4. Primary and Secondary Memories	10	15
5. Buses & I/O Ports	5	10
Total:	**45**	**75**

Reference Books/Study Material:

1. Book Title	: Upgrading and Repairing PCs
Author	: Scott Mueller
Edition	: 22nd Edition
Publisher	: Que

2. Book Title	: Modern Computer Hardware Course
Author	: Lotia Manahar
Publisher	: B P B Publications

3. Book Title	: Computer Hardware
Author	: Hing Lown
Publisher	: Independently Published (Copy Right Material of Author)

4. Book Title : Computer Hardware and Troubleshooting Lab Guide: (Understand, Repair, Upgrade and do troubleshooting your computer (PC's) yourselves)
Author : G. Ganesh Shashidhar
Publisher : Independently Published (Copy Right Material of Author)

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25. ET-HN-02: Peripherals and Data Storage Devices

Objective:

Subject contents are designed with an intention to provide some basic ideas about functionings of the basic peripheral devices like Mouse, Keyboard and different Printers; some basic ideas on functionings of Display and Data Storage Divices and finally deals with general troubleshooting and maintenance of these peripherals and divices using some System Diagnostic Tools.

Duration: 120 Hours (= Theory: 45 Hours + Practical: 75 Hours)

Outline of the Paper

Module Unit	Duration in Hours	
	Theory	**Practical**
1. Mouse, Key Board, Printers	10	25
2. Display Devices and Data Storage Devices	15	25
3. System Diagnostic Tools	20	25
Total:	**45**	**75**

 * Duration may change based upon delivery of contents

Reference Books/Study Material

1. Book Title   : Upgrading and Repairing PCs
Author   : Scott Mueller
Edition   : 22nd Edition
Publisher   : Que

2. Book Title   : Modern Computer Hardware Course
Author   : Lotia Manahar
Publisher   : B P B Publications

3. Book Title   : Computer Hardware
Author   : Hing Lown
Publisher   : Independently Published (Copy Right Material of Author)

4. Book Title   : Computer Hardware and Troubleshooting Lab Guide:
(Understand, Repair, Upgrade and do troubleshooting your computer (PC's) yourselves)
Author   : G. Ganesh Shashidhar
Publisher   : Independently Published (Copy Right Material of Author)

5. Book Title   : Personality Development and Soft Skill
Author   : Barun K. Mitra
Publisher   : Oxford University Press, 2nd Edition

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26. ET-HN-03: Computer Networking and Hardware

Objective:
Subject contents are designed with an intention to provide an Introduction to Computer Networks, other relevant networks and extensively used Network peripherals. it also focuses on various types of internet connections, network services, network security and finally deals with general troubleshooting and maintenance of Networks and networking peripherals.

Duration: 120 Hours (= Theory: 45 Hours + Practical: 75 Hours)

Outline of the Paper

Module Unit	Duration in Hours	
	Theory	Practical
1. Network Hardware Devices	15	30
2. Internet	20	20
3. Bluetooth and Wireless Networking	5	15
4. Networking Diagnostic Tools	5	10
Total:	**45**	**75**

Reference Books/Study

1. Book Title : Computer Network and Data Communications: Guide Question and Answer
   Author: Prof. Satish Jain
   Publisher : B P B Publication
2. Book Title : Computer Network
   Author: Suresh Fatehpuria, Dimple Jayaswal
   Publisher : Genius
3. Book Title   : Internetworking Technology: An Engineering Perspective
   Author: Rahul Banerjee
   Publisher :   Prentice Hall
4. Book Title :   Fundamental of Wireless Communication
   Author: David Tse and Pramod Viswanath
   Publisher :   Cambridge University Press)

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27. ET-HN-04: Working and Maintenance of Systems

Objective:
After completion of this paper the learner will be able to diagnose the problem Desktop /Laptop /Mobile/ Note pad etc. and repair.

Duration: 120 Hours (= Theory: 45 Hours + Practical: 75 Hours)

Outline of the Paper

Module Unit	Duration in Hours	
	Theory	**Practical**
1. Computer Hierarchy	5	10
2. Processor	10	15
3. Laptop	15	20
4. BIOS, Booting and POST Test	5	10
5. OS and Application Software	5	10
6. Virus Removal and Protection	5	10
Total:	**45**	**75**

Recommended Books/Study Material

1. Book Title : Upgrading and Repairing PCs
    Author : Scott Mueller
    Edition   : 22nd Edition
    Publisher : Que
    ISBN-13 : 978-0789756107
    ISBN-10 : 9780789756107

2. Book Title : Modern Computer Hardware Course
    Author   : Lotia Manahar
    Publisher : B P B Publications
    ISBN No. : 9788183331678, 818333167X

3. Book Title : Computer Hardware
    Author   : Hing Lown
    Publisher : Independently Published (Copy Right Material of Author)
    ISBN No. : 9781718124493

4. Book Title: Computer Hardware and Troubleshooting Lab Guide:
    (Understand, Repair, Upgrade and do troubleshooting your Computer (PC's) yourselves)
    Author : G. Ganesh Shashidhar
    Publisher : Independently Published (Copy Right Material of Author)
    ISBN No. : 1983336319, 9781983336317

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28. ET-HN-05: Basic Employability Skills

Objectives:
        The goal of this paper is to take care of generic skills embedded in various job roles in a comprehensive manner and also provides more opportunities and scope for students to engage with these common and necessary skills, such as communication, critical thinking and decision making in different situations pertaining to different job roles.

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Outline Syllabus

Sl. No.	Topic	Duration in hours	
		Theory	Practice
1	Introduction to Employability Skills	04	04
2	Career Development & Goal Setting	03	03
3	Becoming a Professional in the 21st Century	03	03
4	Basic English Skills	02	02
5	Communication Skills	08	08
6	Financial and Legal Literacy	04	04
7	Self-management Skills	05	05
8	ICT Skills	13	13
9	Entrepreneurial Skills	06	06
10	Diversity & Inclusion	03	03
11	Constitutional values - Citizenship	02	02
12	Essential Digital Skill	03	03
13	Green Skills	04	04
	Total:	**60**	**60**

Recommended Books:
1) "Employability Skills" Textbook for Class X, NCERT
2) "Employability Skills - Common For All Trades", National Instructional Media Institute, Chennai
3) "Promoting Diversity And Inclusion Through Workplace Adjustments - A Practical Guide", International Labour Organization – 2016
4) Nisha Nair & Neharika Vohra, "Diversity and Inclusion at the Workplace: A Review of Research and Perspectives", Indian Institute Of Management - Ahmedabad - India
5) "Career learning for the 21st century", CPD series, Learning and Skills Improvement Service (LSIS), March 2012.

Note:
1. Latest and additional good books may be suggested and added from time to time.
2. Teachers are suggested to arrange Special Seminars/ Woekshops to make the students aware of some additional Employability Skills like "Customer Service Skills" and "Skills for Getting Ready for Apprenticeship & Jobs", etc. that are not covered in the syllabus.

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29. ET-OA-03: Office Management & Secretarial Services

Objectives of the Paper:

The goal of this paper is to make students understand the basic concepts and procedures of Modern Offices. Also the students will be familiarize with the activities of a modern office, role of a Private Secretary in an office besides gaining essential skills in handling of various office operations. As it is very important for an Executive Assistant to write rapidly and accurately, the knowledge of art of writing spoken sounds

with the help of principles of Sir Isaac Pitman would help the students to take notes and carry out office work speedily.

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Outline of the Course

Sl. No.	Topic	Duration (in hours)	
		Theory	**Practical**
	Part A: Office Management		
1	Modern Office	05	
2	Planning and Controlling of Office Functions	07	
3	Personnel Management	07	
4	Time Management	04	
5	Stress Management	02	
6	Conflict Management	02	
7	Office Equipments	02	60
8	Other Useful equipments	01	
	Part B: Secretarial Services		
9	Secretarial Services	07	
10	Handling of Office Machines	07	
11	Organizing Meetings	04	
12	Public Relation	02	
13	General financial principles	04	
14	Use of Office Manuals	02	
15	Office Correspondence and Mails	02	
16	Management Reporting	01	
17	Post Office Services	01	
	Total:	**60**	**60**

Recommended Books:
1) RK Sharma, Shashi Gupta and Sushil Nayar, "Office Management and Procedure", Kalyani Publication, Ludhiana
2) Singh and Chhabhria, "Office Management and Procedure", Dhanpat Rai and Sons, New Delhi
3) BN Tondon, "Manual of Office Management and Correspondence", S Chand and Co., Ram Nagar, New Delhi
4) B.R. Duggal, "Office Management", Kitab Mahal, New Delhi.
5) Dr. R.C. Bhatia, "Principles of Office Management", Lotus Press, Darya Ganj, New Delhi-110002
6) S.P. Arora, "Office Organisation and Management", Vikas Publishing House.
7) R.K. Chopra, "Administrative Office Management", Himalaya Publishing House.
8) Duggal, Balraj, "Office Management and Commercial Correspondence", Kitab Mahal, New Delhi.

9) Chhabra, T. N., Modern Business Organisation, Dhanpat Rai & Sons, New Delhi.
10) P. K. Ghosh, "Office Management", Sultan Chand & Sons. New Delhi
11) R. K. Chopra, "Office Management", Himalaya Publishing House
12) Chopra & Chopra, "Office Management", Himalaya Publications
13) Sharma & Gupta, "Office Organisation & Management", Kalyani Pub.
14) Krishna Murty, "Office Management", S. Chand Publications

15) Secretarial Practice - B.N.TANDON
16) Secretarial Practice - S.A.Sherlekr
17) Secretarial Practice - M.C Kuchhal.
18) Secretarial Services by Evelyn Anstin, Macdonald &Evavs.

Syllabus for Practicals: *Official and Business Correspondence*

(a) Application Writing
(b) Complaint Writing.
(c) Social Letters like Informal Letters/ Invitation Letters/ Congratulation Letters/ Thanks Giving Letters/ Condolence Letters etc. and letters to the Editors.
(d) Government Correspondence:- General Govt. Letters, Demi Official Letters, Office Memorandum, Circulars, Notifications, Office Orders, Endorsements, Press Release, Advertisements, Tender, Unofficial Notes etc.
(e) Business Correspondence:- Letters of enquires and replies. Letters of status and credit enquiries. Letters placing orders. Confirmation, modification and non-acceptance of orders. Letters of complaints and adjustments. Circular letters. Quotation, Order, Tender, Complaint letter, Adjustment Letter etc.
(f) General Banking Correspondence:- Account opening letters, Credit Letters, Guarantee Documents, Standing Instructions for Payment, Request for Bank over Draft etc. Dunning Letter, Insurance letters.
(g) Identification of Dispatch and Diary Register with the entry Procedure and practical use
(h) Identification of various files and practical use thereof.
(i) Practical knowledge of various official tools and equipment and their use.
(j) Visit to the various post offices
(k) Filling up of various online forms by using internet i.e. rail, bus, air tickets and booking of hotels etc.

Suggested Readings:
- Sinha, K.K., Business Communication, Galgotia and Sons, New Delhi.
- P.K. Ghosh, "Office Management", Sultan Chand & Sons. New Delhi
- Chawla, Shailesh K. Essential Business Communication, Mayur Paper Back.
- Campbell, Jeremy, Grammatical Man. Simon & Schuster.
- Rajendra Pal Korahill, "Essentials of Business Communication", Sultan Ch and & Sons,New Delhi, 2006.
- Ramesh, MS, & C. C Pattanshetti, "Business Communication", R.Chand&Co, New Delhi, 2003.
- Rodriquez M V, "Effective Business Communication Concept" Vikas Publishing Company, 2003.

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30. ET-OA-04: Basic Online Applications and Google Workspace

Objectives:
- To enable the students to have some basic ideas on Online Application
- To enable the students to have some basic idea on how to handle electronic devices like- Mobile Phones, Tablets etc.
- To enable the students to have some basic ideas on Online Transactions and Digital Payments

Duration: 120 hours (Lectures: 60 hours+ Practicals: 60 hours)

Marks Distribution: Theory – 70, Practical – 30

	Marks Distribution	
	Theory	**Practical**
Part A: Basic Online Applications	35	15
Part B: Google Suite & Multimedia Packages	35	15
Total:	**70**	**30**

Outline of the Paper:

Sl. No.	Topic	Minimum number of hours	
		Theory	**Practical**
	Part A: Basic Online Applications		
1	Introduction to Digital Devices	05	05
2	Operating Digital Devices	05	05
3	Accessing Services Through Internet	05	05
4	Communications Using The Internet	05	05
5	Internet & Mobile Applications	05	05
6	Safety and Security in Digital Technology	05	05
	Part B: Google Workspace & Multimedia Packages		
1	Google Workspace	20	20
2	Multimedia Packages	10	10
	Total:	**60**	**60**

Books for References:
1. NDLM hand book-English-final
2. The Ultimate Guide to G Suite, Zapier Team
3. Sumitabha Das, "Unix : Concepts and Applications", Tata McGraw-Hill , 2008.

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Apprentice/ Mini Project:

An Apprentice or Mini Project of 60 (sixty) hours duration [to be completed in 10 (ten) or 20 (twenty) working days] to be carried out by a student in a reputed organisation/firm. He/ she has to submit a report along with a certificate from the qualified supervisor in a prescribed format after completing the period to become eligible to get PDWKT/ DCA/ DIA/ DMAT/ ADCA Original Certificate from AEDC Ltd. Such an activity provides the students to acquire a real-life experience to develop their skills. The Apprentice/ Mini Project carries 100 marks.

Major Project:

A Major Project of 120 (sixty) hours duration to be carried out by a student under the supervision of a qualified supervisor in a reputed organisation/firm and submit a report along with a certificate from the supervisor in a prescribed format after completing the Project Period to become eligible to get the PGDCSA

Original Certificate from AEDC Ltd. It provides the students to acquire a better real-life experience to develop their skills. The Major Project carries 200 marks.

On-the-job training (OJT):

The On-the-job training (OJT) will be a practical approach to help the students in acquiring new competencies and skills needed for a job in a real, or close to real, working envirnment for the students of DCHN course. It will be of 60 (sixty) hours duration and will be used to learn how to use particular tools or equipment in a live-work practice, simulated, or training environment. OJT will carry 100 marks.

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