



ज्ञानगंगा घरोघरी

Yashwantrao Chavan Maharashtra Open University,

Nashik

School of Computer Science

Syllabus P32: BCA

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**Yashwantrao Chavan Maharashtra Open University,
Dnyangangotri, Govardhan, Near Gangapur Dam,**

Nashik – 422 222

(0253) 2230717

Web Site: <http://ycmou.digitaluniversity.ac>

Email: scs.ycmou@gmail.com

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First Year

Semester 1

Semester I		
Sr. No.	Course Code	Course
1	CMP207	Computer Fundamentals
2	CMP204	Office Tools
3	CMP201	Programming Expertise in C
4	CMP250	Mathematics for Computers
5	CMP262	Study Skills

Part A: Computer Basics

- **Introduction:** Unit Characteristics of Computers, The Evolution of Computer, The Computer Generations (First Generation, Second Generation, Third Generation, Fourth Generation, Fifth Generation)
- **Basic Computer organization:** Input unit, Output Unit, Storage Unit, Central Processing Unit, Arithmetic Logic Unit, Memory, Control Unit, The System Concept
- **Number Systems:** Non Positional Number Systems, Positional Number Systems, Binary Number Systems, Octal Number Systems, Hexadecimal Number Systems, Converting from One Number system to Another Base, Converting from Decimal to Another Base (Division-Remainder Technique), Converting from a Base Other than 10to a Base Other Than 10
- **Processor And Memory:** Central Processing Unit (CPU), The Control Unit, The Arithmetic Logic Unit (ALU), Instruction set, Registers, Processor speed, CISC and RISC Processors, EPIC Processors, The Main Memory, Storage Evolution Criteria, Main Memory Organization, Main Memory Capacity, Static and Dynamic R am
- **Secondary Storage Devices:** Sequential and Direct-Access Devices, Magnetic Disk, Advantages and Limitations of Magnetic Disks, Uses of Magnetic Disks, Optical Disks, Basic Principals of Operation, Types of Optical Disks, Advantages and Limitations of Optical Disks, Uses of Optical Disks
- **Input-Output Devices:** Input Devices (Keyboard Devices, Point-and –Draw Devices, Data Scanning Devices, Digitizer, Electronic-Card Reader, Voice Recognition Devices, Vision-Input System, Off-line Data Entry Devices), Output Devices (Monitors, Printers, Plotters, Computer Output Microfilm (COM), Screen Image Projector, Voice Response Systems)
- **Computer Software:** What is Software, Relationship Between Hardware and Software, Types of Software, Application Software, Logical System Architecture
- **Operating System:** Main Functions of an Operating System, Measuring System Performance, Process Management, Process Management in Early Systems, Multiprogramming, Multitasking, Multithreading, Multiprocessing, Time-Sharing, File Management, File Structure, File Access Methods, File Operations, File Naming, Directories/Folders
- **The Internet:** Definition, Brief History, Its Basic Services, Electronic Mail, File Transfer Protocol, Telnet, Usenet News, Internet Search Engines, Major Elements of Internet Search Engines, Categories of Internet Search Engines, Some Popular Internet Search Engines, Uses of The Internet, How to Get Connected to the Internet?, Direct/Leased-Line Connection, Remote Dial-Up Connection

- **Multimedia:** What is Multimedia, What is a Multimedia Computer system?, Multimedia Components, Text, Graphics, Animation, Audio, Video, Multimedia Applications, Education Entertainment, Marketing, Groupware, Science and Engineering

Part B: Windows 7

- **GETTING STARTED WITH WINDOWS 7**
 - WHAT IS WINDOWS 7
 - VERSIONS OF WINDOWS 7
 - NEW FEATURES OF WINDOWS 7 OS
 - STARTING WINDOWS 7
 - WINDOWS 7'S AERO INTERFACE
 - GETTING ACQUAINTED WITH WINDOWS 7 DESKTOP
 - GETTING STARTED WITH WINDOWS 7
 - CLOSING WINDOWS 7
- **EXPLORING THE START MENU**
 - GETTING ACQUAINTED WITH THE START MENU
 - WHAT IS NEW IN THE START MENU
 - THE STRUCTURE OF THE START MENU
 - CONTENTS OF LEFT PANE AND RIGHT PANE
 - SHUTDOWN AND OTHER BUTTONS
 - THE SEARCH BOX
 - USING START MENU
 - OPENING PROGRAMS FROM START MENU
 - OPENING PROGRAMMES FROM SEARCH TEXT BOX
 - CLOSING WINDOWS 7 AND SHUTTING DOWN YOUR COMPUTER
- **CUSTOMIZING START MENU**
 - START MENU PROPERTIES
 - WINDOWS CLASSIC START MENU
 - WORKING WITH PROGRAM SHORTCUTS
 - ADDING PROGRAM SHORTCUTS TO ALL PROGRAMS MENU
 - TURNING OFF THE AUTO SORT FEATURE
 - DISABLING THE DISPLAY OF CONTEXT MENU AND DRAG AND DROP FEATURE IN ALL PROGRAMS LIST
 - PINNING PROGRAMS TO THE START MENU
 - CUSTOMIZING THE START MENU FOLDERS
 - MODIFYING THE CONTENTS OF THE RIGHT PANE
 - ADDING FAVORITES FOLDER, RECENT ITEMS FOLDER, RUN COMMAND TO THE START MENU
 - RECENTLY USED DOCUMENTS LIST
 - CHANGING USER ACCOUNT NAME, PICTURE
 - MOVING THE START BUTTON
 - RESTORING START MENU DEFAULT SETTINGS

- **EXPLORING WINDOWS 7 DESKTOP**
 - WHAT'S NEW IN WINDOWS 7 DESKTOP
 - A QUICK TOUR OF DESKTOP
 - ICONS
 - ELEMENTS OF TASKBAR
 - GETTING ACQUAINTED WITH MOUSE
 - GETTING TO KNOW KEYBOARD
 - WINDOWS 7 KEYBOARD SHORTCUTS

- **CUSTOMIZING WINDOWS 7 DESKTOP**
 - WORKING WITH DESKTOP ICONS
 - CLASSIFICATION OF ICONS
 - REARRANGING ICONS ON THE DESKTOP
 - ADDING ICONS TO THE DESKTOP
 - CUSTOMIZING THE DESKTOP BACKGROUND
 - CUSTOMIZING DESKTOP USING THEMES
 - WINDOWS AERO THEMES
 - DESKTOP SLIDE SHOW THEME
 - CREATING CUSTOM DESKTOP SLIDE SHOW THEME
 - CUSTOMIZING THE THEME
 - CUSTOMIZING DESKTOP USING BACKGROUND, SCREEN SAVERS
 - CUSTOMIZING SOUND SCHEMES, TEXT EFFECTS
 - CUSTOMIZING POWER SETTING, DISPLAY SETTINGS, VISUAL EFFECTS
 - CUSTOMIZING MOUSE

- **EXPLORING WINDOWS 7 TASKBAR**
 - IMPORTANCE OF TASKBAR
 - USES OF TASKBAR
 - PINNING AND UNPINNING PROGRAMS TO THE TASKBAR
 - TASK BUTTONS
 - THUMBNAIL PREVIEWS
 - PEEK FEATURE, AERO PEEK
 - NOTIFICATION AREA (SYSTEM TRAY) AND ITS CUSTOMIZATION
 - VIEWING THE APPLICATIONS CURRENTLY ON

- **CUSTOMIZING WINDOWS 7 TASKBAR**
 - DISPLAYING THE TASKBAR AND START MENU PROPERTIES DIALOG BOX
 - POSITIONING THE TASKBAR ON THE DESKTOP
 - CUSTOMIZING TASKBAR AND TASKBAR BUTTONS
 - APPEARANCE OF RELATED PROGRAM ICONS ON TASKBAR
 - THUMBNAIL PREVIEWS OF MINIMIZED PROGRAMS AND DOCUMENTS
 - ADDING TOOLBARS TO THE TASKBAR
 - SHOWING OR HIDING THE TOOLBAR TITLE
 - SETTING UP DATE AND TIME, TIME ZONE, ADDITIONAL CLOCKS
 - SYNCHRONIZING COMPUTER CLOCK WITH AND INTERNET TIME SERVER

- **EXPLORING WINDOWS 7 EXPLORER**
 - FUNCTIONS OF WINDOW EXPLORER
 - INVOKING EXPLORER FROM START BUTTON, START MENU, SEARCH BOX, SYSTEMS FOLDER, WINDOWS LOGO KEY
 - STRUCTURE OF WINDOW EXPLORER

- **WORKING WITH WINDOWS IN WINDOWS 7**
 - STRUCTURE OF A WINDOW- TITLE BAR, PROGRAM'S LOGO, APPLICATION WINDOWS CONTROL BUTTONS, TOOLBAR OR RIBBON INTERFACE, MENU BAR, TOOLBARS, RULERS, WORK AREA, SCROLL BARS
 - MINIMIZING, MAXIMIZING, RESTORING AND RESIZING WINDOWS
 - MOVING WINDOW
 - SWITCHING BETWEEN WINDOWS
 - REARRANGING THE OPEN WINDOWS
 - WINDOWS FLIP 3D FEATURE
 - SHOW DESKTOP FROM TASKBAR
 - SHOW DESKTOP BUTTON OR AUTO PEEK FEATURE

- **WORKING WITH FILES AND FOLDERS IN WINDOWS 7**
 - BASIC OF FILE SYSTEM
 - STRUCTURE OF FILE NAME
 - FILE ICONS
 - FILE TYPES
 - DEFAULT PROGRAMS
 - CHANGING THE DEFAULT ASSOCIATED PROGRAMS
 - BASICS OF FOLDER SYSTEM
 - LIBRARIES AND PERSONAL FOLDERS
 - COMMON FOLDERS
 - CREATING A FILE USING AN APPLICATION
 - CREATING A FILE ON DESKTOP, IN ANY FOLDER
 - CREATING A FOLDER ON DESKTOP
 - CREATING A NEW FOLDER IN EXPLORER

- **MANAGING FILES AND FOLDERS IN WINDOWS 7**
 - RENAMING FILES AND FOLDERS
 - SELECTING SINGLE/MULTIPLE FILES AND FOLDERS
 - SELECTING ALL OBJECTS OF THE EXPLORER FOLDER WINDOW
 - COPYING AND MOVING FOLDERS AND FILES
 - COPYING AND MOVING MULTIPLE FOLDERS
 - DELETING FILES AND FOLDERS
 - USING RECYCLE BIN

- **WORKING WITH IN WINDOWS 7 SEARCH TOOL**
 - SPECIFYING SEARCH CRITERIA
 - USING WILDCARD CHARACTERS
 - INSTANT SEARCH

- ADDING AND DELETING FOLDERS FROM INDEX
- SEARCHING FROM START MENU
- CUSTOMIZING THE START MENU SEARCHES
- SEARCHING FROM WINDOWS EXPLORER
- SEARCHING FOR FILES USING FILTERS
- USING BOOLEAN OPERATORS
- EXTENDING AND SAVING SEARCHES
- SEARCHING WITH SAVED SEARCHES

MS Word

- Working with documents, Editing the documents, Spell and Grammar checking
- Formatting the documents
Character formatting, paragraph formatting, Bullet and numbering, indents, tabs, headers, footers, footnotes, endnotes, borders and shading,
- Viewing a document, Printing the document
- Working with tables, Columns
Creating, modifying, formatting tables
- Special features of Word, WordArt
- Organization chart
- Mail merge

MS Excel

- Exploring Excel Worksheet, Entering data in Worksheets
- Working with Formulas and functions
- Formatting worksheets, Managing, Printing worksheets
- Creating, Formatting Charts, Adding graphs and other objects
- Database Management, Protecting the data
- Special features of Excel

MS Power Point

- Exploring Power Point Interface
- Basics of Creating Power Point Presentations
- Managing Text Objects
- Working with Word Art, Drawing Tools
- Creating Organizational Charts
- Formatting Presentations, Building Presentations
- Applying Transition Effects, Animating Presentations
- Incorporating Multimedia clips
- Running the Presentation

MS Outlook

- Exploring Outlook XP Interface
- Working with emails, Messages, Contacts
- Working with Calendar, Tasks, Journals
- Working with Security measures
- Customizing Outlook

MS Access (Basics)

- Creating Database Applications Worksheet
- Entering data in Worksheets
- Designing Tables from Scratch
- Working with Datasheet View
- Field Properties and Data Validation
- Sorting and Filtering of Records
- Working With Forms, Queries, Action Queries
- Creating Crosstab and Parameter Queries
- Using Functions and Operators in Queries
- Working With Reports
- Creating a Mailing List and Mail Merging
- Working with SubForms and Subreports
- Working with Lookup Fields and Lookup Wizard

CMP201	Programming Expertise in "C"
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- History of C, Character Set, Constants, Variables, Keywords, Type Declaration, Simple I/O Statements, Comments, First C Program
- C Compilers, IDE, C Instructions, Modes of Arithmetic Operations, Hierarchy of Arithmetic Operators, printf(), Numbering Systems, Escape Sequences
- Instructions, if-else statement and its various forms, Relational Operators, sizeof Operator
- Logical Operators and their usage, Hierarchy of Operators, Conditional Operators
- Conversions of Basic Data Types, Loop Control Instruction, Increment/Decrement Operators, Binary Representation of float and double
- Break statement, exit(), while and for statement, various forms of each looping instruction
- do-while Loop, Pros and Cons of different looping statements, break and continue statements, switch statement
- Menu Management, goto keyword, Functions, Returning a Non-Integer Value, Call by value / Call by reference, Recursion, Pointers
- far and near pointers, Accessing VDU Memory, Keyboard Status Bytes, Determining memory size, Size of Pointers
- Recursion and its Advantages, Data Types subtleties, auto, register, static, and extern Storage Classes, Declaration Vs Definition, C Preprocessor
- Preprocessor Directives, Macros, Conditional Compilation, Miscellaneous Directives, #pragma, Arrays, Sorting
- Pointer Arithmetic, Accessing Arrays using Pointers, Passing Arrays to Functions, 2-D and 3-D Arrays, Strings, String Library Functions
- Structures, Array of Structures, Nested structures, Passing structure elements to Functions, Passing structures to Functions, Applications
- Exploring Floppy and Hard Disk, Boot Sector, Boot Parameters, Reading Boot Sector and Partition Table contents
- Directory Entry, Attribute Byte, Loading / Saving a File, I/O in C, Formatted Output using printf(), Escape Sequences
- Unformatted Console I/O, Disk I/O, Buffered I/O, File Copying, File Encryption, Offset & Substitution Cipher, Record I/O, Low Level Disk I/O,
- Types of Microprocessors, Display Adapters and Monitors, Graphics and Text Modes, Video Display Modes, Drawing Graphics
- Colors and Palettes, Bitwise Operators, Animation, Mouse Programming, Freehand Drawing
- Interaction with Hardware through C, CPU Registers, Unions, Issuing Interrupts, Renaming and Deleting Files, Booting Procedure
- Memory Organization, Dynamic Memory Allocation, Dangling Pointers, Memory Leaks, Debugging Techniques

- **Relevance of Mathematics**
- **Set Theory:** Set notations, Types of sets, Set Operations, Properties of set operations, Venn diagrams
- **Mathematical Induction:** The first principle of Mathematical Induction, Applications of the first principle of Mathematical Induction
- **Exponents and Logarithms, surds:** Exponential form, integral exponents and Laws of Exponents, Fractional exponents and surds, Logarithms and Laws of Logarithms, Change of Base, Application of Logarithms in complex calculations
- **Number systems:** Binary number system, Conversion of decimal number to binary number and vice versa, Addition and subtraction of binary numbers, Octal and Hexadecimal number systems, Conversion of decimal number to Octal, Hexadecimal number and vice versa
- **Permutations and combinations:** Addition and Multiplication principles of counting, Factorial of a number, Permutations, Combinations
- **Mathematical Logic:** Statements, Logical connectives and Truth tables, Converse, inverse and contrapositive of a statement, Compound statements and Logical equivalence, Tautologies and Contradiction
- **Relations:** Cartesian product of sets, Relations, Matrix representation, Types of Relations, Equivalence Relations and Equivalence Classes, Reflexive closure, Symmetric closure, Transitive Closure
- **Functions:** Functions, Types of functions, Composition of functions
- **Vectors:** Vectors, types of vectors, Algebra of vectors, Products of vectors, Collinear and coplanar vectors
- **Determinants and Matrices:** Determinant, Properties of determinants, Matrix, types of matrices, Algebra of matrices, Inverse of a matrix
- **Mensuration:** Areas of plane figures, Perimeter and circumference, Surface area, Volume
- **System of Linear Equations:** Linear equation, System of linear equations, Solution of System of linear equations, Cramer's Rule
- **Polynomials:** Polynomials in one variable, Degree of Polynomial, Equality of Polynomials, Addition and multiplication of Polynomials, Roots of Polynomial equation, Quadratic equations and their roots
- **Introduction to Graph Theory:** Graph – definition and common terminology in Graph theory, Types of graphs, Connectivity, Eulerian and Hamiltonian graphs, Planar graphs and colouring problem, Trees

- **Organize Yourself:** Planning to study, Workplace readiness and ambience, Goal setting and motivation, Study habits, Managing resources, Time management, Nature and importance of study skills.
- **Observation and perceiving Skills:** Nature and importance of observing and perceiving, The Observation process, Distortions in observing and perceiving, Improving observation skills
- **Listening Skills:** Nature and importance of listening, Listening and hearing, Listening methods, Effective listening, Problems related to listening, Towards effective listening.
- **Reading Skills:** Nature and importance of reading, Forms of reading, Reading methods, Reading speed, Problems related to reading, Towards effective reading.
- **Writing Skills:** Nature and importance of writing, Types of writing, Writing methods, Problems related to writing, Towards effective writing
- **Referencing Skills:** Importance and application, Learning Resources, Purposive accessing, Problems in referencing, Towards effective referencing
- **Examination Techniques:** Types of Examinations, Memory and retention, preparing for examination (Planning and scheduling, Time management, Practice and revision etc), Preparation stages: Prior to examination, During Examination, After Examination, Facing examinations effectively

First Year

Semester II

Sr. No.	Course Code	Course
1	CMP202	Data structure using C
2	CMP203	OOPs and C++
3	CMP209	Data Communication and Networking
4	CMP242	Humanities and Social Obligations
5	CMP230	Communication skills and Technical writing

CMP202	Data Structure using C
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- C Basics
- Searching and Analysis of Algorithms, Hashing Techniques
- Sorting: Algorithms and Merge sort, Quick Sort
- Structures
- Sparse Matrices
- Dynamic memory allocation & Linked Lists
- Operations on Linked Lists
- Circular and Doubly Linked Lists, Sparse Matrices as Linked Lists, Recursive LL, Generalized LL & Unions
- Stacks, Queues, Trees
- Conversions
- Binary Search Trees, Threaded Binary Trees
- Heap, B-Trees and 2-3 Trees
- Graphs, Spanning Tree
- Memory Management
- Garbage Collection

- Inheritance and Containership
- Shallow Copy
- References
- Dynamic memory management
- Compile-time Polymorphism
- Name mangling
- Templates
- Exception Handling
- Run time polymorphism
- Virtual Functions
- VTABLE & VPTR mechanism
- C++ free store
- Pointers: Pointer to members, Pointer to objects, Smart pointers & their usage, Auto Pointers & their usage
- Sorting techniques
- Algorithms & their selection criteria
- Searching techniques
- Hashing techniques & their selection criteria

- **Introduction to Data and Network Communications Software:** Signals, Analogue Versus Digital Transmission, Limits on achievable data rate in digital communication, Data Communication System
- **Data Transmission:** Mode of Data Transfer, Character codes, Digital Data Rates, Transmission Mode, Transmission Impairment, Communication Channel, Channel Capacity, Analogue And Digital Data, Encoding, DTE-DCE Devices, Modem
- **Error Detection and Correction:** Asynchronous Data Error Detection, Asynchronous Data Error Detection Methods, Error Correction
- **Transmission Medium:** Guided Media, Performance of Transmission Medium, Unguided Media, Satellite Communication, Geo-stationary Satellite, Comparisons
- **Introduction to Networking:** Computer Network, Line Configurations, Direction Of Data Flow, Network Topologies, Categories Of Network
- **Reference Models:** ISO/OSI Model, The TCP/IP Model
- Networking And Internetworking Devices
Repeater, Bridge, Hub, Switch, Router, Gateway
- **Data Link Layer:** Duties Of Data Link Layer, Elementary Data Link Layer Protocols, Sliding window, Example Data Link Protocols, Mac Address
- **Network Layer:** Network Service Model, Logical Addressing, Network Or Internet Layer Protocol, Routing
- **Transport Layer:** Port Address, Transmission Control Protocol (TCP), User Datagram Protocol (UDP)
- **Application Layer:** The World Wide Web (WWW), Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), Trivial File Transfer Protocol (TFTP), Electronic Mail (E-Mail), Simple Mail Transfer Protocol (SMTP), Domain Name System (DNS), COMPARISONS: Comparison Of HTTP And FTP
- **BOOTP and DHCP:** Why not RARP?, Bootstrap Protocol (BOOTP), Dynamic Host Configuration Protocol (DHCP)

- **Introduction, nature and scope of Humanities as a concept:** Historical background (occupations, production and markets in various societies, stands taken by major religions), Role of business, entrepreneurs and governments in the past, Models of Economic development, Concepts of Humanities and Social Obligation in the past
- **A brief review of Indian tradition:** The *Jajmani (balutedari)* system-network of production and distribution in the pre-British period, The British rule over India-Policy of the East India company till 1857 and the colonial rule after 1858, De-industrialisation of Indian traditional industries, The movement for *Swadeshi* – production and education for Indian society
- **The Theoretical background of modern industrialization:** Capitalist model of production and market, Marxist view on production and distribution of commodities, Planning policy and Welfarist model of Indian economy, Globalization, Privatization and Liberalization of national economies
- **Understanding Humanities:** Versatile nature of human beings, Equality, fraternity and equal opportunity as basic values, Human rights (world scenario, Indian situation), Human personality-multi faceted reality
- **Understanding Social Obligation:** Relationship between individual and society, Individual social responsibility: theory and practices, Corporate social responsibility (theory and practices), Social obligation: theory and practices

Part I: Communication Skills

- **Communication:** Meaning of Communication, The Communication Process, Forms of Communication
- **Non-verbal communication**
- **Verbal communication:** Oral Communication (formal, informal), Written Communication (formal, informal)
- **Barriers in Communication**
- **Towards effective communication**

Part II: Technical Writing

- Nature and importance of Technical writing
- Professional communication
- Business Presentations

Part III: Preparing for a Job

- Assessing market requirements
- Identifying personal strengths and weaknesses
- Preparing a Resume / Curriculum Vitae
- Applying for the job
- Facing an interview, Participating in a Group Discussion

Second Year

Semester III

Sr. No.	Course Code	Course
1	CMP213	Programming Excellence through C#
2	CMP256	Oracle
3	CMP402	Mobile Application Development
4	CMP258	Professional Development
5	CMP253	New Developments in IT
6	CMP400	Environmental Studies

Group 1

CMP402	Mobile Application Development
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- The basics of J2ME
- Connected, Limited Device Configuration (CLDC)
- Mobile Information Device Profile (MIDP)
- Development Environment
- Building and executing MIDP Applications
- Creating a High-Level User Interface
- Creating a Low-Level User Interface
- Managing Data on the Device
- Accessing Network Data and Services
- Module End Assessment
- History, Vision And Future Of HTML5
- Getting Started With HTML5
- Structure Of A Web Page
- Forms
- Audio And Video
- HTML5 Canvas
- Data Storage
- HTML5 Offline Applications
- HTML5 Geolocation
- HTML5 Web Workers
- HTML5 Messaging APIs
- HTML5 Web Sockets
- Module End Assessment
- What is an Android?
- Android Architecture
- Activity & Intent
- UI & Advance UI
- Thread, Services, Broadcast Receiver
- Notification & Alarm Manager
- Content Provider
- URI & Content Resolver
- Location Manager
- GPS & Map View

Group 2

CMP213	Programming Excellence through C#
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- Getting Started
- Constants, Variables, Keywords
- First C# Programme
- Using Visual Studio
- Generic Programs
- Instructions
- Precedence And Associativity
- Decision Control Instruction
- Logical Operators, Conditional Operators
- Conversions And Comparisons
- Repetition Control Instruction
- Loops: While, For , Do While
- Case Control Instruction
- Nuances Of Case Control Instruction Menu
- Functions
- Communication Using Functions
- Recursion
- Object Oriented Programming
- Classes And Objects
- Member Functions
- Static Functions
- Arrays
- Property
- Operator Overload
- Bitwise Operators
- Inheritance
- Exception Handling
- User Defined Exceptions
- Abstract Classes
- Interfaces
- Namespaces
- Effective IO
- Filter And Other Streams
- Serialization
- Collection Classes
- Collection And Nested Classes
- Generics
- User Defined Generics
- Networking Today
- Networking And Security
- Network Serialization
- Zip Unzip
- Multithreading And Synchronization
- Web Services
- Using XML Reflection

Group 2

CMP256	ORACLE
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- **Architecture:** An Introduction to RDBMS, Architecture of Oracle DBMS, Data Modeling and Normalization, SGA And Client Server Architecture, Oracle Objects, Securities in Oracle
- **SQL:** What is SQL, Types of SQL statements, SQL SELECT Statement, FROM and WHERE Clauses, Operators Used in SQL, SELECT-GROUP By, Order By and Like
- **Transaction Handling:** Create Table, Data types, Updating Tables, Drop Rename and Alter, Transactions
- **SQLPlus:** Introduction, Formatting SQLPlus Reports
- **Data Aggregation:** Group Functions, Aggregating Results with Different Clauses, SQL Joins, Nested Queries, Non correlated and correlated subqueries, Operators in nested queries, Set Operators
- **Pseudo columns, Views & Sequences**
- **Integrity Constraints**
- **PL-SQL:** Introduction, PL-SQL Block Structure, Variables Constants and Comments, PL-SQL DataTypes, Records
- **Loops:** IF Statement, CASE Statement, Sequential Statements, Loop Control, Arrays
- **Cursors:** Creating and Using Cursors, Cursor Attributes, FOR Loop and Parameterized Cursors
- **Exception Handling**
- **Stored Subprograms:** Stored Subprograms, Stored Procedures, Stored Functions, Parameters and OverLoading, Packages
- **Triggers:** Triggers. DML Triggers, Database Event Triggers

Group 2

CMP216	Distributed Computing through COM/DCOM
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- What is COM?
- Difference between a traditional DLL and a COM DLL
- Real COM example
- Using standard interface
- Building a server
- Building a simple client
- Building an MFC client
- Building Server and Client
- Connection points
- A Calendar ActiveX control using ATL
- Multiple controls
- Reusability In COM
- Directory tree control
- File list control
- Client program that uses Directory list & File list controls
- Stock property pages
- Directory copy control
- Adding Tooltip to an ActiveX control

Group 2

CMP248	Linux
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- **Booting, Logging In, and Configuring:** Booting Red Hat Linux, Finishing First-Run Configuration, Logging In for Configuration, Identifying the Parts of the Login Screen, Configuring Your Printer, Configuring Your Dial-Up Internet Service, Starting the Network Configuration Tool
- **Using Linux at the Console:** Understanding Virtual Consoles, Switching Between Consoles,; Introducing the Shell, Fundamentals of Using the Shell, The Windows File System, Files and Directories, The Home Directory, The Current Working Directory, Manipulating Files and Directories, Using Relative Paths, Deleting Files and Directories, Executable Files, Symbolic Links, Understanding Permissions, Long File Listing, Identity and File Ownership, Ownership and File Permissions, Changing Permissions
- **Working with Console:** Creating, Editing, and Saving Text Files, Inserting text in vi; Editing Text in vi, Using emacs to Create Text Files, The emacs Menu Keystrokes, Grouping Files for Efficient File Management, Grouping Files on the Command Line, Preventing Filename Expansion, Searching Files and Directories Quickly, Searching the Entire Filesystem with locate, Searching Text Files for Word Patterns, Searching for Text Files That Contain Specific Words, Using Command Output for Complex Tasks, Using Pipes to Link Commands, Using One Command's Answers As Another's Argument, Moving Between Multiple Open Applications, Resuming a Job with fg, Running a Job in the Background with bg
- **Getting Help at the Console:** Introducing Manual Pages, Using Manual Pages: The Basics, Understanding Manual Page Sections, Locating Manual Pages Through Topic-Based Searches, Using the GNU info System, Navigating the info System, Using info Efficiently, Using the /usr /share /doc Tree, Reading Extra Application, Documentation, Searching the /usr /share /doc Tree, Getting Help from the Commands
- **Linux Shell:** Sending Text to Standard Output with echo, Performing Simple Calculations with expr, Displaying Text File Beginning or Endings with head and tail, Editing, Streams of Data with sed, Using Shell Variables and Quoting, Creating and Substituting Variables, Environment Variables, Creating Your Own Commands Using Shell Scripting, Processing Command-Line Arguments, Making myscript Easily Executable, Using Conditional Statements, Testing Over and Over Again, Repeatedly Executing for a Predefined Set
- **GNOME and KDE:** GNOME and KDE in Red Hat Linux 8, Logging In to the Desktop , Navigating the Desktop, Launching Application; Using Window Controls, Moving, Resizing, Minimizing, and Maximizing Windows, Application Menus, Working with Multiple Windows, Changing the Active Application,

Minimizing and Restoring with the Taskbar, Shading a Window, Understanding Virtual Desktops, Knowing Which Desktop is Active, Selecting a New Desktop, Moving a Running Application to a New Desktop, Using the KDE Window Management Menu, Logging Out of the GNOME Desktop

- **Working with Files on the Desktop:** Creating a New Text File Using the Text Editor, Using the File Manager, Opening a File Manager Window, Navigating the Directory Tree, Working with Files and Directories, Opening, Editing, and Closing an Existing File, Cutting, Copying, and Pasting Files, Duplicating a File in the Current Directory, Selecting Multiple Files, Creating a symbolic Link, Renaming an Item, Deleting Items, Changing File Permissions, Creating a New Directory, Rearranging or Sorting Icons, Manipulating Files Using Drag and Drop, Moving a File into a Directory or to the Desktop, Moving a File Between Two Directory Windows, Context Drag and Drop, Working with Trash Contents, Restoring Files That Have Been Thrown Away, Emptying the Trash
- **Creating and formatting open office writer document:** The Open Office Applications, Creating and formatting Open Office Writer Document, Working with Open Office Calc, Working with Open Office Impress, Working with Open Office Draw
- **Networking on the Desktop:** Launching the Mozilla Browser, Browsing the Web with Mozilla, Disabling Pop-up Windows, Launching Evolution, Configuring Evolution, Composing a New Email, Using HTML Formatting in Your Message, Attaching a File to Your Message, Sending Your Message, Downloading New Mail, Replying To Or Forwarding a Message, Accessing an Attachment, Printing and Deleting, Exiting Evolution, Accessing Windows Networks, Accessing Files on windows Machines in GNOME, Using File Transfer Protocol (FTP) on the Desktop, Connecting to a Remote System, Copying Files to a Remote System, Copying Files from a Remote System, Closing an FTP Connection
- **Getting Help on the Desktop:** Using Application Help, Using the About Option in Help Menus, Using What's This? In KDE Applications, Viewing Help Contents in GNOME Applications, Viewing KDE Application Handbooks, Using Systemwide Help in GNOME and KDE, Launching and Using GNOME's Help Browser, Launching and Using KDE's Help center, Reading Other Documentation on the Desktop, Reading man and info Pages Using the GNOME Help Browser, Reading man and info Pages Using KDE's Konqueror
- **Command-Line System Administration:** Using the su Command, Managing System Processes, Listing Running Processes, Adjusting Process Priority, Killing Running Processes, Managing Running Services, Understanding Runlevels, Selecting Automatically Started Services, Stopping, Starting, and Restarting Running Services, Managing Filesystems, Creating Filesystems, Mounting and Unmounting Filesystems, Maintaining the/etc/fstab File, Managing Accounts, Adding and Removing User Accounts, Adding and Removing Groups, Administering Groups

Changing Group Membership, Using cron to Manage Periodic Jobs, Adding Systemwide cron Processes, Editing Per-User cron Processes

- **Desktop System Administration:** Managing System Processes, Adjusting Process Priority, Killing Running Processes, Managing Running Services, Launching and Quitting the Service Configuration Tool, Enabling or Disabling Services, Stopping, Starting, and Restarting Services, Managing Network Interfaces, Editing Static IP or DHCP Properties, Manually Configuring DNS Information, Enabling or Disabling Network Interfaces, Managing Accounts, Adding and Removing Users, Adding and Removing Groups, Editing Group Membership, Reading System Logs, Mounting and Unmounting Filesystems, Formatting a Device or Partition
- **Security Basics:** Managing the Red Hat Linux Firewall, Starting the Security Level Configuration Tool, Choosing Security Level and Common Services, Understanding Advanced Permissions, Changing File Ownership, Using chmod in Numeric Mode, Understanding Special Permissions, Protecting the Root Account, Enabling the wheel Group, Adding User to wheel, Changing Ownership and Permissions of su, Logging Out Users Automatically, Setting a Login Timeout, Removing Minor Shells
- **Installing Software:** Installing and Removing Red Hat Components, Package management Tool, Third Party Software, Using the rpm Command, Application Launchers
- **Network File Services:** NFS Server Configuration Tool, Configuring NFS at command line, Windows File Sharing Services, Using Desktop Tools to install SWAT, Configuring Samba Shares
- **Web and FTP Services:** Before Configuring Web Server, Configuration of DNS server, Configuring and Running web server, Configuring and Running FTP server
- **Backups, Troubleshooting and Rescue:** Backup and Restore, Troubleshooting

- **Part 1: Introduction to Professional Development**
 - Self – awareness and self – concept
 - Profession and professional development: concept and meaning
 - Importance of professional development

- **Part 2: Theories to understand self and others:**
 - Jo–Hari Window
 - Rogers Theory
 - Transactional Analysis

- **Part 3: Factors That Influences Professional Development:**
 - Communication: Concept and Meaning, Process of Communication, Channels and Types of Communication, Barriers in communication, Professional communication process – writing (e–mail, letters etc) presentation, speaking (introduction and greetings) and phone etiquettes
 - Motivation: Motivation – meaning and concept, Importance of motivation, How an employee is motivated, Theories of motivation (Maslow’s Theory, Fredrick Herzberg, Alderfers Theory, Self – Determination Theory)
 - Decision Making: Why is decision making important, individual decision making – Concept and process, Group decision making - Concept and process
 - Goal Setting: Goal setting – Meaning and concept, Importance of goal setting, Edwin Locke’s goal setting theory of motivation
 - Time Management: Time management – concept, and meaning, Its Importance, How we can manage time
 - Training and Development: Training - Meaning and concept, Importance of training and Development, Types of Training, Feedback system and its importance
 - Leadership: Concept and meaning of leader, Types of Leadership, Leadership skills, Difference between manager and leader
 - Teamwork And Team Building: Team – meaning and concept, Difference between team and group, why is teamwork important, stages of team building, Team leader and team player.
 - Interview And Resume Skills: Resume - Its Importance, Techniques of writing an effective resume, interview – meaning and importance, Types of interview, Interview process, Frequently asked questions in interview
 - Stress Management: Stress – concept and meaning, Reasons for stress, Types of Stress, Stress Management

Study Material Available on the following link:

<http://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf>

Multidisciplinary nature of environmental studies

Definition, scope and importance

Need for public awareness.

Natural Resources: Renewable and non-renewable resources:

- Natural resources and associated problems.
 - Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
 - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
 - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
 - Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
 - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :-
 - Forest ecosystem
 - Grassland ecosystem
 - Desert ecosystem
 - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its conservation

- Introduction – Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation

- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Environmental Pollution

- Definition
- Cause, effects and control measures of :-
 - Air pollution
 - Water pollution
 - Soil pollution
 - Marine pollution
 - Noise pollution
 - Thermal pollution
 - Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: floods, earthquake, cyclone and landslides.

Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness.

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS.

- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

Field work

- Visit to a local area to document environmental assetsriver/forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

Second Year

Semester IV

Sr. No.	Course Code	Course
1	CMP263	Systems Analysis and Design
2	CMP223	Computer Organization
3	CMP247	JAVA
4	CMP220	Programming Excellence through VB.NET
5	CMP206	Principles of Data Base Management System

- **The System Design Environment**
 - Introduction
 - Process in Building Information Systems
 - Organization of the Book
 - Development Process
 - Methods and Tools
 - Management Processes
 - Who is involved in Building Information Systems?
 - Organizing the People
 - What does a Systems Analyst do?
 - Supporting Process
 - The Importance of Teamwork and Communication
 - Keeping Track of Design Documents
 - System Structures
 - People, Processes and Data
 - Database – a variety of Artifacts
 - Personal Systems
 - Centralized Systems
 - Distributed Systems
- **System for Coordination**
 - Introduction
 - The Changing Organization
 - A Hierarchical view
 - Towards Flatter Structures
 - Working in Teams
 - The Importance of Process
 - Information Exchange and Personal Relationships
 - Supporting Information Exchange
 - Supporting Personal Relationships
 - Supporting Planned Work
 - Transaction Processing Systems
 - Supporting Situated Work
 - Choosing the Support System
 - Identifying the group activities
- **Some Business Information Systems**
 - Introduction
 - Introduction to Typical Information Systems
 - System Integration
 - Business Processes
 - Trends in Business Processes
 - Human Resource unit Processes
 - Client Services Processes
- **Concept Formation**
 - Introduction

- Finding the Problem
 - Finding Problems using External Considerations
 - Finding Problems using Internal Considerations
- **Requirements Analysis**
 - Introduction
 - The Importance of Communication
 - What do we do in System Development?
 - Different ‘Languages’
 - Representing Systems
 - Identifying Requirements
 - Describing the usage World
- **Interviewing**
 - Introduction
 - Information Sources
 - System users
 - Forms and Documents
 - Computer Programs
 - Procedure Manuals
 - Reports
 - Gathering Information Through Interviewing
 - Interviewing Search Procedures
 - What if there is no existing system?
 - The Interview Plan
 - The Interview
 - The Interview Structure
 - How to get Information from Interviews
 - Following up for Detailed Information
- **The Development Process**
 - Introduction
 - Teams and their work
 - Types of Teams structure
 - Structured Teams
 - Synchronous and Open Team Structures
 - Random Teams
 - Describing the development process
 - Defining the development steps
 - The Linear or Waterfall cycle
 - Team and Documentation support
 - Assuring Quality
 - Linear cycle phases
- **Data Flow Diagrams**
 - Introduction
 - Data flow diagram symbols
 - Processes
 - Files or Data stores
 - External entities
 - Data flows

- Describing Systems by data flow diagrams
- **Describing Data**
 - Introduction
 - Entity – Relationship Analysis
 - Terminology
 - Entity – Relationship structures
 - More about entity – Relationship modeling
 - Modeling relationship cardinality
 - Modeling Relationship Participation
 - Building Entity – Relationship Models
 - Each set to model one concept
 - Choosing attributes
 - Choosing object set names
 - An analysis sequence
- **Process Descriptions**
 - Introduction
 - Natural Language specifications
 - Scripting
- **Documentation**
 - Introduction
 - Documentation
 - The Documentation configuration
 - DFD diagrams
 - Data structure
 - Data stores and data flows
 - Entity – relationship diagrams
 - Process descriptions
 - Entries in object modeling
 - Other kinds of entries
 - Cross – Referencing
 - Documentation as a standard
 - Using the document configuration
 - Project Reports
 - Maintaining a configuration
 - Manual systems
 - Automated systems
- **Designing The New System**
 - Introduction
 - Starting with system objectives
 - kinds of objectives
 - Reducing objectives
- **User Interface Design**
 - Introduction
 - What makes a good interface?
 - Choosing the transaction modules
 - Defining the presentation
 - Evaluating the presentation

- Workspaces
- Robustness
- Usability
- Interactive Interfaces
 - User dialog for transactions
 - Comparing dialog methods for transaction Processing
 - Controls for Interactive Transaction Input
- Designing a World Wide Web Interface
- Interactions for Problem – Solving
 - Multi – Window Displays
 - Multimedia Displays
- Interfaces for Personal Support
- Interfaces for Workgroups
- Interfaces design tools
- Off – Line Transactions
 - Off – Line Input Interface
 - Controls with Off – Line Input
 - Off – Line Output

- **Structure of Computer System:** Introduction, brief history of computers, Von Neumann architecture, computer components, computer function, interconnections structures, bus interconnection. Computer Arithmetic – scalar data types, fixed and floating point numbers, signed numbers, integer arithmetic 2's complement addition, subtraction, multiplication, Booths algorithm, hardware implementation, bit-pair recording, division- restoring and non restoring algorithms, floating point representations, IEEE standards, floating point arithmetic
- **Central Processing Unit (Intel 8086 as a representative example):** CPU architecture, register organization, instruction format, addressing modes (8086 and PDP-11), instruction cycle, instruction pipelining.
- **Control Unit:** Single bus organization of a processor, Control unit operation, Instruction sequencing, branching, micro-operations, Hardwired control. Micro-programmed control- microinstruction sequencing and execution, comparison between hardwired and micro-programmed control.
- **Memory Organization:** Characteristics of memory system, memory hierarchy, main memory – ROM: PROM, EPROM, RAM: SRAM, DRAM, SDRAM, RDRAM, High Speed Memory - Cache memory, organization and mapping, replacement algorithms, cache coherence, MESI protocol. Virtual memory implementation, Secondary storage: Magnetic disk, tape, RAID, CDROM, and DVD
- **Input Output Systems:** I/O addressing, Programmed I/O, Interrupt Driven I/O, Trap, Fault exceptions, 8086 interrupt structure, I/O channels, DMA concept. Standard Buses: Synchronous, asynchronous, parallel, serial, PCI, SCSI, and USB ports, RS-232C, IEEE 488. Study of Peripherals: Keyboard, Mouse, Scanners, Video displays, Printers- Dot-matrix, desk-jet, laser printers
- **OS Support and Advanced Architectures:** Components of operating system (OS), DOS-BIOS, it's loading, DOS-BIOS interrupts, TSR's, Installable device driver, RISC and Super scalar processors: RISC features, register file, RISC vs. CISC, Super scalar processors- Overview and organization

- **Fundamentals of Object-Oriented Programming:** Object-Oriented Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of OOP, Applications of OOP
- **Java Evolution:** Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Supports Systems, Java Environment
- **Overview of Java Language:** Simple Java Program, More of Java, Use of Math Functions, Comments, An Application with Two Classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style
- **Constants, Variables, and Data Types:** Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values
- **Operators and Expressions:** Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators; Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions
- **Decision Making and Branching:** Decision Making with If Statement, Simple If Statement, The If...Else Statement, Nested of If...Else Statements, The Else If Ladder, The Switch Statement, The ? : Operator
- **Decision Making and Looping:** The While Statement, The do Statement, The for Statement, Jumps in Loops, Labelled Loops
- **Classes, Objects and Methods:** Defining a Class, Field Declaration, Methods Declaration, Creating Objects, Accessing Class Members, Constructors, Methods of Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Methods with Vararge, Visibility Control
- **Arrays, Strings and Vectors:** One-dimensional Arrays, Creating an Array, Two-Dimensional Arrays, Strings, Vectors, Wrapper Classes, Enumerated Types, Annotations
- **Interfaces: Multiple Inheritance:** Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interfaces Variables
- **Packages: Putting Classes Together:** Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes, Static Import
- **Multithreaded Programming:** Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a Tread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization; Implementing the 'Runnable' Interface
- **Managing Errors and Exceptions:** Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging

- Elements of .NET Platform, Common Language Runtime, .NET Base Class Library, Common Type System
- Data types, Type Safety, Type Conversion, Console I/O, Operators, Control Instructions, Loops, Procedures, Call by Ref, Call by Val, Modules
- Difference between Procedural & OO Programming, Classes & Objects, Access Specifiers, Me, References
- Constructors, Overloaded Constructors, Optional keyword, Overloaded functions, Shared Data, Shared Constructor, Read-only, Inheritance, Notinheritable Classes
- Arrays-Rectangular & Jagged, For Each-in loop, Passing Arrays to Methods, System. Array Class
- Strings, System. String Class, Structures, Classes vs. Structures, Reference Types vs. Value Types, ParamArray, Common Type System, Interoperability, Properties, Indexers
- Namespaces, Enumerations, Reflections, Exception Handling
- Polymorphism, VTABLE, Late Binding
- Overridable, NotOverridable, MustInherit, MustOverride, Interfaces, Implementing Multiple Interfaces
- Collections Namespace, Stack, Queue, Hash table, Dictionary, IEnumerator
- WinForms - GDI+
- GDI+ - Transformations, Processing Mouse & Keyboard Input, Events & Delegates
- Controls, Employee Form, Building UI
- User Controls, Building application with MSAgent COM component
- SDI, Menus, Toolbars, Statusbars
- File I/O & Serialization, MDI
- Threading, How to launch threads, Thread States, Thread Priorities, Foreground and Background Threads
- Synchronization using Synclock, Monitor, Mutex, Events, R-W Locks and Interlocked mechanism, Thread Pooling
- Multithreading-Synchronization, Thread Pooling, Assemblies, Static and Dynamic linking, Dll Hell, Disadvantages of DLLs, COM
- Assemblies & Manifests, Creating and Using Private & Shared Assemblies, Deployment, Delayed Signing
- Versioning, Redirection, Application Domains, Language Interoperability, COM Interoperability
- Networking Basics, TCP/IP chat, UDP
- Internet, Http GET and POST, Request, Response, Uploading and Downloading files using WebClient
- Software Architecture, ADO.NET Architecture, SQL.NET and OLE DB.NET Data Providers, Creating & Accessing Stored Procedure
- Writing Image to Database, Accessing BLOB, Connected & Disconnected Approaches, Using DataGrid Control, Declarative and Programmatic Transactions
- XML, XML & ADO.NET, XML Document Parser, XML Reader, XML Writer
- Web Architecture, Pros & Cons of Server Scripts/Programs, ASP.NET, Creating ASP.NET Applications, Server Controls
- Validation Controls, Accessing Database Through ASP.NET Application, Web User Controls
- ASP.NET State Management Models, Session States, State Management Through Database, Cookiless State Management
- Distributed Computing Issues, XML WebServices, Creating & Deploying Web Services, WSDL & UDDI, Consuming Web Services, Mobile Client
- Transaction Support, State Management, Web Service Security, Remoting Architecture, Server Activation vs. Client Activation, Web Service vs. Remoting
- Printing, Printing Multi-Page Documents, Common Printing Dialogs
- .NET Security Models, Role Bases Security, Code Access Security

- **Introduction to Database Management Systems**
 - Database – An Introduction
 - The Database Management System
 - Advantages of Using a Database
 - Features of Data in a Database
 - Components of a DBMS
 - The Three Level Architecture for a Database System
 - Different Levels of Abstraction
 - Database Design
- **Data Modeling**
 - Data Modeling - An Introduction
 - Types of Data Models
 - Record Based Logical Models
 - Object Based Data Models
 - Other Data Models
- **Entity Relationship Modeling**
 - Entity – Relationship Model
 - Components of an E–R model
 - Entity – Relationship Diagram
 - Relationships
- **Introduction to Relational Database Management Systems**
 - RDBMS Terminology
 - The Relational Data Structure
 - Keys
 - Relational Data Manipulation
- **Normalization**
 - Relational Database Design
 - Functional Dependencies
 - Closures of a Set of Functional Dependencies
 - Closures of a Attribute Sets
 - Canonical Cover
 - Introduction to Normalization
 - Normalization Using Functional Dependencies
 - Boyce – Codd Normal Form (BCNF)
 - Normalization Using Multivalued Dependencies
 - Normalization Using Join Dependencies
- **Structured Query Language**
 - SQL – AN Introduction
 - History of SQL
 - Advantages of SQL
 - SQL Commands
 - SQL Data Types and Literals
 - Literals
 - SQL Operators

- Embedded SQL
- **Queries and Subqueries**
 - Basic Queries in SQL
 - Aggregate Functions
 - Grouping While Selecting
 - Joins
 - Set Operations
 - Subqueries
 - Join Vs Subqueries
- **DML and DDL Commands**
 - Data Manipulation Language Commands
 - Data Definition Language Commands
 - Tables
 - Views
- **Transaction Processing**
 - The Concept of Transaction
 - States of Transaction
 - Concurrent Execution of Multiple transactions
 - Serializability
- **Concurrency Control and Deadlock Recovery**
 - Introduction
 - Lock – Based Protocols
 - Protocols
 - Timestamp – Based Protocols
 - Thomas' Write Rule
 - Validation – Based Protocols
 - Deadlock Handling

Third Year

Semester V

Sr. No.	Course Code	Course
1	CMP205	Software Engineering
2	CMP255	Operating Systems
3	CMP212	Building Web Portals through ASP.NET
4	CMP214	Enterprise solutions using J2EE
5	CMP221	Statistical Techniques

- Software Engineering and Models: Evolution of SE, Software Standards, Importance of SE, Various Models – Waterfall, Spiral , RAD
- Requirement Analysis: SRS, Fact Finding ,DED,ERD, DD, Structure Charts
- Software Design: Architectural Design, Modular Design with SC Guidelines – Coupling / Cohesion, Interface Design – Screen Design
- Coding, structured programming, programming practices: Logic, Algorithm Design, Design walk through, Critical Design Review, Coding, Programming Practices, Structured Programming
- Software Testing and Maintenance: Testing Strategies, Testing Architecture, Testing Tools, Maintenance, Defect analysis
- Quality Assurance: Attributes for Quality, Quality Standards, Checklist, SEI/CMMi
- Software Configuration Management: Software Change Management, Software Configuration Management, Change Control
- Latest trends in Software Engineering: Web SE, Case Tools, Project Matrix, UML, XP programming, OOAD, Agile programming

- **History of The Operating Systems:** Zeroth Generation, 1st Generation, 2nd generation, 3rd Generation, 4th Generation (Desktop Systems, Multiprocessor Systems, Distributed Processing Clustered Systems, Handheld Systems)
- **Computer Architecture:** 4GL Program, 3GL Program, 2GL Program, 1GL Program (Assembler, Instruction Format, Lading/Relocation), 0GL (Hardware Level) (Basic Concepts, CPU Registers, ALU, The Switches, The Decoder Circuit, The Machine Cycle), Context of a Program, Interrupts (Need, Computer Hardware for Interrupts)
- **Operating System –Functions And Structure:** Different Services of the Operating Systems, Information Management, Process Management, Memory Management, Uses of System Calls, Portability, User’s View of the Operating System, GUI, Operating System Structure (Monolithic (Simple) Operating System, Layered Operating System, Microkernel Operating System, Exokernel Operating system), Virtual Machine, Booting
- **Information Management** Disk Basics, Direct Memory Access (DMA); File System (Block and Block numbering Scheme, File Support Levels, Writing/Reading a Record, Relationship between the Operating System and DMS, File Directory Entry, Open/Close Operations, Disk Space Allocation Methods, Directory Structure: User’s View, Implementation of a Directory System); Device Driver (DD) (Basics, Path Management, Submodules of DD, I/O Procedure, I/O Scheduler, Device Handler, Interrupt Service Routine (ISR), Complete Picture); Terminal I/O(Terminal Hardware, Terminal Software); CD-ROM, Organizing Data on the CD-ROM, DVD-ROM
- **Process Management:** Process, Evolution of Multiprogramming, Context Switching, Process States, Process State Transitions, Process Control Block (PCB), Process Hierarchy, Operation on a Process, Create/ Kill/ Dispatch a Process, Change the Priority of a Process, Block / Time Up /Wake Up a Process, Suspend/ Resume Operations, Process Scheduling (Objectives, Concepts of Priority and Time Slice, Scheduling philosophies, Scheduling Levels, Scheduling Policies (For Short Term scheduling)), Multithreading (Models, Implementation of Threads)
- **Inter Process Communication:** The Producer-Consumer Problems, Solutions to the Producer-Consumer Problems (Interrupt Disabling/Enabling, Lock-flag, Primitives for Mutual Exclusion, Implementation of Mutual Exclusion Primitives, Alternating Policy, Peterson’s Algorithm, Hardware Assistance, Semaphores), Classical IPC problems (Algorithm, Monitors, Message Passing)
- **Deadlocks:** Graphical Representation of a Deadlock, Deadlock Prerequisites, Deadlock Strategies (Ignore a Deadlock, Detect a Deadlock, Recover from a Deadlock, Prevent a Deadlock, Avoid a Deadlock)
- **Memory Management:** Single Contiguous Memory Management, Fixed Partitioned Memory Management , Variable Partitions (Allocation Algorithms, Swapping, Relocation and Address Translation, Protection and Sharing, Evaluation), Non-Contiguous Allocation –General Concepts, Paging (Allocation Algorithms, Swapping, Relocation and Address Translation), Segmentation (Swapping, Address Translation and Relocation, Sharing and Protection), Combined Systems, Virtual Memory Management Systems (Relocation and Address Translation, Swapping, Relocation and Address Translation, Protection and Sharing, Evaluation, Design Consideration for Virtual Systems)

CMP212	Building Web Portals through ASP.NET
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- Introduction To .NET
- Creating First Website
- HIML
- Building Dynamic Websites
- Managing Contacts
- Telephone Contacts User Interface
- Contacts – Professional Style
- Cascaded Style Sheets
- Add Contacts, Delete Contacts, Change Contacts
- Get And Requests
- XML Contacts
- Contact book Using Database
- SOL Contact Class
- Contact List And Contacts Manage Implementation
- Secure Database Programming
- Employee Management Website
Database Design, Relationships, Database Diagrams And Data Entry, Web Form, Finishing Touches
- Grid View Control, Details View Control
- Grid View Edit And Delete

CMP214	Enterprise solutions using J2EE
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- Constants, Variables, Keywords
- First Java Program
- Using NetBeans
- Generic Programs
- Instructions
- Precedence And Associativity
- Decision Control Instruction
- Logical Operators, Conditional Operators
- Conversions And Comparisons
- Repetition Control Instruction
- Loops: While, For, Do While
- Case Control Instruction
- Nuances Of Case Control Instruction Menu
- Functions, Communication Using Functions
- More About Functions
- Recursion
- Object Oriented Programming
- Classes and Objects
- Member Functions, Static Functions
- Arrays
- Using NetBeans Effectively
- Bitwise Operators
- Inheritance
- Exception Handling, User Defined Exceptions
- Abstract Classes
- Packages
- Effective IO
- Filter And Other Streams
- Serialization
- Collection Classes, Collections And Inner Classes
- Generics Templates
- User Defined Generics
- Networking Today, Networking And Security, Network Serialization
- Zip Unzip
- Multithreading And Synchronization
- WebServices
- Using XML
- Reflection And Annotations

- **Data Condensation and Graphical Methods**
 - Attributes and Variables
 - Classification
 - Frequency Distribution
 - Cumulative Frequency Distribution
 - Relative Frequency Distribution
 - Graphical Representation of Frequency Distribution
 - Histogram
 - Frequency Polygon
 - Frequency curve
 - Ogive or Cumulative Frequency Curve:
 - Diagrams
 - Simple Bar Diagram
 - Sub-divided Bar Diagram
 - Pie Diagram
- **Measure of Central Tendency**
 - Objectives and Requisites of a Good Average
 - Arithmetic Mean
 - Calculation of Arithmetic Mean
 - Corrective wrong value
 - Properties of Arithmetic Mean (Statements only)
 - Merits and Demerits of Arithmetic Mean
 - Median.
 - Calculation of Median
 - Merits and Demerits of Median
 - Mode
 - Calculation of Mode
 - Merits and Demerits of Mode
 - Empirical Relationship Among Mean, Median and Mode
 - Appropriate Choice of an Average
- **Measures of Dispersion**
 - Requisites for an Ideal Measure of Dispersion
 - Absolute and Relative Measures of Dispersion
 - Range
 - Computation of Range
 - Merits and Demerits of Range
 - Variance and Standard Deviation
 - Computation of Variance
 - Computation of Standard Deviation(S.D)
 - Properties of Variance and standard Deviation
 - Merits and demerits of variance
 - Coefficient of Variation
 - Numerical Examples
- **Moments and Measures of Skewness and Kurtosis**
 - Moments
 - Raw Moments (about origin)
 - Central Moments
 - Relation between Raw and Central Moments
 - Properties of Central Moments
 - Skewness
 - Positively Skewed Distribution
 - Negatively Skewed Distribution
 - Measures of Skewness
 - Kurtosis
 - Pearsoian Coefficients to Measure Skewness and Kurtosis based on Moments
 - Numerical Examples

- **Correlation and Regression**
 - Correlation
 - Bivariate Data
 - Correlation.
 - Positive and Negative Correlation
 - Methods of Studying Correlation.
 - Scatter Diagram Method
 - Karl Pearson's Coefficient Of Correlation
 - Definition
 - Properties of Correlation Coefficient (Statements only)
 - Limits $-1 \leq r \leq 1$; change of origin and change of scale
 - Regression
 - Lines of Regression
 - Line of Regression of X on Y and Y on X
 - Properties of Regression Coefficient [bb' ≤ 1]
 - Numerical Examples
- **Probability**
 - Idea of deterministic and non- deterministic models.
 - Sample space : (finite, countably infinite)
 - Events : Types of events, operations on events.
 - Probability : Classical definition, probability models
 - Axioms of probability
 - Probability of events.
 - Theorems on Probability (only statements)
 - i) $0 \leq P(A) \leq 1$, (ii) $P(A) + P(A^c) = 1$, (iii) $P(A) \leq P(B)$ when
 - $A \subset B$ (iv) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 - Concepts and definitions of conditional probability : $P(A \cap B) = P(A) * P(B/A)$
 - Concepts and definition on independence of two events.
 - Numerical Examples.
- **Random Variables (Discrete and continuous)**
 - Definition of random variable discrete and continuous random variables
 - Definitions of probability distribution and distribution function, probability mass function.
 - Definition of expectations and variance.
 - Continuous Random Variables
 - Definition through p.d.f.
 - Distribution function: Definition, Statements of Properties.
 - Definition of mean and variance.
 - Numerical Examples.
- **Special Continuous Probability Distributions**
 - Uniform (Rectangular) distribution, definition of p.d.f., mean, variance, probability curve.
 - Exponential distribution: p.d.f. with mean θ , nature of probability curve, mean, variance.
 - Normal distribution: Definition of p.d.f., identification of parameters, probability curve, standard, Normal distribution, distribution of $aX + b$, $aX + bY + c$ when X and Y are independent computation of probabilities with Normal probability tables. Chi-square distribution: definition of chi-square, chi-square variate as the sum of square of n iid standard, normal variates.
 - Students's distribution: Definition, use of t tables for computing probabilities.
 - F distribution: Definition, Use of F tables for computing probabilities.
 - Numerical Examples.
- **Test of Hypothesis**
 - Definition : Random sample, parameter, statistic, sampling distribution of statistic, standard error of statistic
 - Concept of null and alternative hypothesis, critical region, level of significance, types of errors, concept of test of hypothesis, two sided tests.
 - Numerical Examples
- **Large Sample Tests :**
 - $H_0 : \mu = \mu_0$ Vs $H_1 : \mu \neq \mu_0$
 - $H_0 : \mu_1 = \mu_2$ Vs $H_1 : \mu \neq \mu_2$

- $H_0 : P = P_0$ Vs $H_1 : P \neq P_0$
- $H_0 : P_1 = P_2$ Vs $H_1 : P_1 \neq P_2$
- Numerical Examples
- **Small Sample Tests:**
 - Tests based on chi-square distribution
 - Goodness of fit,
 - Independence of attributes,
 - Test for $H_0: \sigma_1 = \sigma_2$ Vs $H_1 : \sigma_1 \neq \sigma_2$ when μ is known and unknown.
 - Tests based on t distribution :
 - $H_0 : \mu = \mu_0$ Vs $H_1: \mu \neq \mu_0$,
 - $H_0: \mu_1 = \mu_2$ Vs $H_1: \mu_1 \neq \mu_2$,
 - paired t test.
 - Tests based on F distribution : $H_0 : \sigma_1^2 = \sigma_2^2$ Vs $H_1 : \sigma_1^2 \neq \sigma_2^2$
 - When population mean is known and unknown.
 - Numerical Examples

Third Year

Semester VI

Sr. No.	Course Code	Course
1	CMP259	Project (P32-BCA)