



હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી

NAAC A (3.02) State University

પો.બો.નં.—૨૧, યુનિવર્સિટી રોડ, પાટણ (ઉ.ગુ.) ૩૮૪૨૬૫

ફોન: (૦૨૭૬૬) ૨૨૨૭૪૫, ૨૩૦૫૨૯, ૨૩૦૭૪૩, ૨૩૩૬૪૮

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પરિપત્ર ક્રમાંક — ૧૨૭ / ૨૦૧૮

વિષય:— M.C.A. Semester-1 to 4,
M.Sc (C.A.&I.T.) Semester-1 & 2 અને
M.C.A.(INTEGRETED) Semester-1 & 2ના નવા અભ્યાસક્રમ અંગે..

આ યુનિવર્સિટીના કોમ્પ્યુટર સાયન્સ ડીપાર્ટમેન્ટના અધ્યક્ષશ્રી અને સંલગ્ન M.Sc.(C.A & I.T.) કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, UGC ની Model Curriculum અંગેની Guideline સંદર્ભે નો M.C.A. Semester-1 to 4, M.Sc (C.A.&I.T.) Semester-1 & 2 , M.C.A.(INTEGRETED) Semester-1 & 2 સુધીનો સામેલ પરિશિષ્ટ મુજબનો નવો અભ્યાસક્રમ એકેડેમિક કાઉન્સિલએ તેની તારીખ: ૦૫/૦૬/ ૨૦૧૮ની સભાના ઠરાવ ક્રમાંક:—૩૪ થી શૈક્ષણિક વર્ષ : ૨૦૧૯—૨૦ થી ક્રમશઃ અમલમાં આવે તે રીતે મંજૂર કરેલ છે. જેનો અમલ કરવા સારૂ સંબંધિતોને આ સાથે મોકલવામાં આવે છે.

આ બાબતની સંબંધિત અધ્યાપકો તથા વિદ્યાર્થીઓને આપના સ્તરેથી જાણ કરવા વિનંતી છે.

- નોંધ :— (૧) વિદ્યાર્થીઓની જરૂરીયાત માટે પરિપત્રની એક નકલ કોલેજના ગ્રંથાલયમાં મૂકવાની રહેશે.
(૨) આ અભ્યાસક્રમ / સ્કીમ યુનિવર્સિટીની વેબ સાઈટ www.ngu.ac.in પર પણ ઉપલબ્ધ કરાવવામાં આવનાર છે.

બિડાણ : ઉપર મુજબ

સહી/—
કુલસચિવવતી

નં.—એ કે / અ× સ / ૩૭૮૭ / ૨૦૧૮
તારીખ: ૯/૦૮/૨૦૧૮

પ્રતિ,

૧. આ યુનિવર્સિટીના કોમ્પ્યુટર સાયન્સ ડીપાર્ટમેન્ટના અધ્યક્ષશ્રી
૨. સંલગ્ન એમ.એસસી.(સી.એ. એન્ડ આઈ.ટી.)કોલેજોના આચાર્યશ્રીઓ
૩. ડૉ.રાજેશ એમ.મહેતા (ડીન—કોમ્પ્યુટર સાયન્સ) આઈ.એન.એસ.બી., બી.સી.એ.કોલેજ, એસ.ટી.સ્ટેન્ડ પાસે, મુ. ઈડર, જિ.સાબરકાંઠા —૩૮૩ ૪૩૦
૪. પરીક્ષા નિયામકશ્રી, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (પાંચ નકલ)
૫. ગ્રંથપાલશ્રી, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ. (વિદ્યાર્થીઓના ઉપયોગ સારૂ રેકર્ડ ફાઈલ માટે)
૬. સિસ્ટમ એનાલીસ્ટશ્રી, કોમ્પ્યુટર (રીઝલ્ટ) સેન્ટર, હેમ.ઉ.ગુ.યુનિવર્સિટી, પાટણ. તરફ પરિણામ માટે તથા વેબસાઈટ પર મૂકવા સારૂ.
૭. માન.કુલપતિશ્રી/ કુલસચિવશ્રીનું કાર્યાલય, હેમ.ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.
૮. અનુસ્નાતક પ્રશાખા (એકેડેમિક), હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ.
૯. મુખ્ય હિસાબી અધિકારીશ્રી (મહેકમ), હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ તરફ → પરિપત્રની ફાઈલ અર્થે
૧૦. સિલેક્ટ ફાઈલે—(૨ નકલ)

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
DEPARTMENT OF COMPUTER SCIENCE

SEMESTER CBCS

MCA SEMESTER– II

Sub. No.	Subject Name	Teaching Scheme			Examination Scheme					
		Total Credit	Theory	Practical	Internal Marks		External Marks		Total Marks	
			Lectures Hours / Week	Per Batch * Hours / Week	Theory (IT)	Practical (IP)	Theory (ET)	Practical (EP)	Theory (IT+ET)	Practical (IP+EP)
MCA-21	Computer Oriented Numerical & Statistical Methods	4	4	--	30		70	--	100	--
MCA-22	Software Engineering	4	4	--	30	--	70	--	100	--
MCA-23	Operating System & UNIX	4	2	2	30	20	70	30	100	50
MCA-24	Object Technology – I	4	2	2	30	20	70	30	100	50
MCA-25	Advanced Database Architecture	4	2	2	30	20	70	30	100	50
Total		20	14	6	--	--	--	--	500	150

Note : * Indicates 60 students batch per practical.

IT – Internal Theory

IP – Internal Practical

ET – External Theory

EP – External Practical

H. N. G. University , Patan
M.C.A – Semester - II
MCA-21: Computer Oriented Numerical & Statistical Methods

Unit: 1 **[25%]**

Solutions of Non-Linear Equations :

Absolute, Relative and Percentage Error, Roots of an equation, Linear and non -Linear equations (Definition and Difference), Methods for finding roots of non-Linear equations : Bisection Method, False Position Method, Newton -Raphson Method and secant Method (Example only- No algorithm)

Unit: 2 **[25%]**

Solution of Simultaneous Linear Equations :

Definitions : System of linear equations, Existence of unique roots, multiple roots and no roots, Difference between direct and iterative methods, Gauss -Elimination Method, Gauss-seidel Method

Unit: 3 **[25%]**

Frequency Distribution :

Collection of data, Classification of data, Class interval, Types of Classes, Class frequency, Class mark, Class Boundaries, Width of a class, Frequency density, Relative frequency, Percentage frequency, Cumulative frequency

Method of Central Tendency :

Introduction, Arithmetic Mean, Simple and weighted for raw data, Discrete frequency distribution, Continuous frequency distribution, Properties of A.M., Merits & Demerits of A.M., Median for raw data, Discrete frequency distribution, Continuous frequency distribution, Merits and demerits of Median, Mode for raw data, D.f.d., C.f.d., Merits & demerits of mode

Measures of Dispersion :

Introduction, Range, coefficient of range, Quartiles, Quartiles deviations, coefficient of quartile deviations, Mean deviation and coefficient of mean deviation, S.D and variance for all types of frequency distribution, Coefficient of Dispersion, Coefficient of variation

Unit: 4 **[25%]**

Correlation :

Definition of Correlation, Types of Correlation, Scatter Diagram Method, Karl Person's Correlation Coefficients, Correlation Coefficients for Bivariate frequency distribution, Probable error for Correlation Coefficients

Regression :

Definition of Regression, Regression lines, Regression Coefficients, Properties of regression Coefficients, Fitting of regression lines and estimation for Bivariate frequency distribution

Text Books :-

For Unit -I & II

Computer Oriented Numerical Methods – Third Edition (V. Rajaraman)

For Unit-III and IV

Fundamental of Statistics – Sixth Edition(S.C. Gupta)

Reference Book :

- Introductory Methods of Numerical Analysis (S.S. Sastry)
- Statistical Methods (S.P. Gupta)
- Business Statistics (R.S. Bhardwarj)

H. N. G. University , Patan
M.C.A – Semester - II
MCA-22: Software Engineering

Unit: 1 **[25%]**

Introductory Concepts: Historical perspective, Software myths.
The Process: Software process, Software process models - The waterfall model, Incremental process models, Evolutionary process models, Specialized process models.
Design Methods: Design principles, Design concepts, Effective modular design, Data design, Transform mapping, Transaction mapping.

Unit: 2 **[25%]**

Verification, Validation and Testing : Strategic approach to software testing, Test strategies for conventional software, Validation Testing, System Testing, The art of debugging, Black box Testing, White box Testing, Control structure Testing, Software Quality, Metrics for Analysis, Metrics for Design, Metrics for source code, Metrics for Testing, Metrics for maintenance.

Unit: 3 **[25%]**

Project Planning and Risk management : Software measurement, Project planning process, Software scope & Decomposition techniques, Empirical estimation model, Make/Buy decision, Reactive versus Proactive risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, Risk mitigation, monitoring, and management, Safety risks and hazards, The RMMM plan.

Unit: 4 **[25%]**

Software Quality Assurance : Quality concepts, The quality movement, Software quality assurance, Software reviews, Formal technical reviews, Formal approaches to SQA, Statistical quality assurance, Software reliability, The SQA plan, Introduction to ISO standards, Software configuration management.

Text Books:

1. Pressman R.S: Software Engineering: A Practitioner approach, McGraw hill

Reference Book:

1. Sommerville I: Software Engineering, Addison Wesley

H. N. G. University , Patan
M.C.A – Semester - II
MCA-23: Operating System & UNIX

Unit: 1

[25%]

Operating System Overview :

Introduction to Operating System, Types of Operating system, Operating System Services

Process Management:

Process, Process Control Block (PCB), Process States, Scheduling – Types of Schedulers, Scheduling & Performance Criteria, Scheduling Algorithms – FCFS, SJF, Priority & Round Robin (RR) Scheduling. Interprocess Synchronization: Mutual exclusion, Semaphore, Classical Problems in Synchronization, Intraprocess Synchronization: Critical Region, Deadlocks.

Unit: 2

[25%]

Memory Management :

Static Memory Allocation, Dynamic Memory Allocation, Segmentation, Virtual memory – Paging, Demand Paging , Page Replacement, Fragmentation & Defragmentation, Cache memory.

Unit: 3

[25%]

I/O Management:

Program Controlled I/O, Interrupt Driven I/O, USART, PIT File Management: File concept, Access method, Directory structure, Disk Space Management - Continuous allocation, Non continuous allocation, File related system services

Unit: 4

[25%]

Distributed Systems:

Protocol Architecture, TCP/IP Architecture, Client/Server Computing, Message Passing, Remote Procedure Calls.

UNIX Overview:

Features of Unix, Types of shell, Unix file system, Editors of Unix: (VI)

Text Books:

1. Silberschatz & Galvin: Operating System Concept, Wiley, Sixth Edition
2. Milan Milenkovi'c : Operating Systems, Tata McGraw – Hill, Second Edition.
3. William Stallings : Operating Systems, PHI, Fourth Edition
4. Yashavant Kanetkar : Unix Shell Programming, BPB.

Unit: 1

[25%]

Java's Magic:

The Byte-code, Features of Java, IDE for Java, Object -Oriented Programming in Java, Java Program Structure and Java's Class Library.

Data Types, Variables, and Operators :

The Simple Data Types, Literals, Variables, Type Conversion and Casting, Automatic Type Promotion in expressions, Java Operators, Operator Precedence.

Selection Statements:

Control Statements – if and switch, Scope of Variable, Iterative Statements – for, while, do.... While, Jump Statements.

Defining Classes :

Definition of a Class, Definition of Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, The Variable this, Defining and Using a Class, Automatic Garbage Collection.

Unit :2

[25%]

Arrays and Strings :

Arrays, Arrays of Characters, String Handling Using String Class, Operations on String Handling Using String Buffer Class.

Extending Classes and Inheritance :

Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super class -Object Class.

Packages & Interfaces :

Understanding Packages, Defining a Package, Packaging up Your Classes, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface.

Exception Handling :

The Idea behind Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions

Multithreading Programming:

The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter-thread communication, Deadlocks

Unit : 3

[25%]

Input/Output in Java :

I/O Basic, Byte and Character Structures, I/O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits.

Creating Applets in Java:

Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using the Status Window, The HTML APPLET Tag Passing Parameters to Applets.

Working with Windows:

AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Window in an Applet, Displaying Information Within a Window.

Unit : 4

[25%]

Working with Graphics and Texts :

Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts, Managing Text Output Using Font Metrics, Exploring Text and Graphics.

Working with AWT Controls, Layout Managers and Menus :

Control Fundamentals, Labels, Buttons, Check Boxes and Check, Box Groups, Choice Controls, Lists, Scroll Bars, Text Field and Text Area Controls, Understanding Layout

Managers, Flow Layout Manager, Border Layout Manager, Grid Layout Manager, Using Insets Manager, Card Layout Manager, Menu Bars and Menus, Dialog Boxes, File Dialog

Handling Events in Java :

Two Event Handling Mechanisms, The Delegation Event Model, The Event Handling Process, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model, Adapter Classes

Text Book:

1. The Complete Reference JAVA 2, 4th Edition, TMH Publication.
2. Beginning JAVA 2 (JDK1.3 Edition), Ivor Horton, WROX Public.

Reference Book : -

1. Teach Yourself JAVA, Josheph O'Neil & Herb Schildt, Tata McGraw Hill
2. JAVA 2 UNLEASHED, Tech Media Publications.
3. JAVA 2(1.3) API Documentations.
4. Programming with JAVA: A printer, Balagurusamy,2nd Edition, Tata McGraw Hill

Unit: 1 **[25%]**

The Oracle Instance Architecture

Introduction
Defining the Instance
Creating the Instance

The Oracle Database Architecture

Defining the Database
The SYS and SYSTEM Schemas
Understanding the Components of the Database
Understanding Database Segments
Oracle Data Dictionary
Other Database Objects

Exploring the oracle Environment

Creating the Oracle Environment
Designing an Optimal Flexible Architecture
Creating Your First Database

Unit: 2 **[25%]**

SQL Plus for Administrators

Administering SQL Plus
Using the SQL Plus COPY Command
Using SQL to Create SQL
Tracing SQL Statements

Oracle Enterprise Manager

Understanding the Enterprise Manager Architecture
Using the Database Administration Tools

PL/SQL

Index, View, Sequence, Trigger, Procedure, Function, Package, Cursor, Exception Handling

Unit: 3 **[25%]**

IMPORT/EXPORT

Understanding Import/Export
Controlling & Configuring Import/Export
Walkthrough of Import/Export Sessions
Using SHOW & INDEXFILE Options

SQL*Loader

Components of SQL Loader
Looking at SQL Loader Examples
Conventional and Direct Path Loading

Unit: 4 **[25%]**

Managing Database Storage

Administering Database Objects
Understanding Database Fragmentation
Managing Rollback Segments
Identifying Storage Problems
Administering Growing Database

Integrity Management

Introduction
Implementing Locks
Analyzing v\$lock
Monitoring Locks on the System
Avoiding Locks: Possible Solutions
Implementing Locks with Latches

BackUp and Recovery

Types of Backup
Database Backup in offline and online mode
Database recovery

Performance Tuning fundamentals

Understanding Why You Tune

Knowing the Tuning Principles

Tuning Goals

Using the Return on Investment Strategy

Text Books:

1. William Page & Nathan Hughes : Using Oracle8/8i Special Edition, Prentice Hall India.

Reference Books:

1. Oracle Unleashed,
2. Oracle10g Complete Reference, Kevin Loney , Tata McGraw-Hill,2004.
3. Oracle Bible,
4. Oracle Architecture, Oracle Press.
5. Oracle Database 10g DBA Handbook, Kevin Loney & Bob Bryla , Tata McGraw-Hill,2005