।। सा विद्या या विमुक्तये ।।

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

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प्रस्तुत विद्यापीठाच्या न्यु मॉडल डिग्री कॉलेज, हिंगोली येथील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचा CBCS Pattern नुसारचा अभ्यासक्रम शैक्षणिक वर्ष २०२०—२१ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, **दिनांक २० जून २०२० रोजी संपन्न झालेल्या ४७व्या मा. विद्या परिषद बैठकीतील विषय क्र.११/४७—२०२०** च्या ठरावानुसार **प्रस्तुत विद्यापीठाच्या न्यु मॉडल डिग्री कॉलेज, हिंगोली येथील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचा** खालील विषयाचा **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचा अभ्यासक्रम शैक्षणिक वर्ष २०२०—२१ पासून लागू करण्यात येत आहे.

01. BCS -II Year- (Bachelor of Computer Science)

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेत—स्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड — ४३१ ६०६.
जा.क्र.: शैक्षणिक—१/परिपत्रक/पदव्युत्तर (विद्यापीठ परिसर व उप—परिसर)—सीबीसीएस अभ्यासक्रम/२०२०—२१/५२३
दिनांक : १०.०८.२०२०.

उपकुलसचिव
शैक्षणिक (१—अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, न्यु मॉडल डिग्री कॉलेज, हिंगोली.
५) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
६) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
७) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

Swami Ramanand Teerth Marathwada

University's

New Model Degree College, Hingoli - 431513

Revised Syllabus of

Second Year - Bachelor in Computer Science
(B.Sc. in Computer Science 2nd Year)

With effective from 2020-2021 and onwards

PEO, PO and CO Mappings

1. **Program Name** : B.Sc.(Computer Science) at NDMC

2. **Program Educational Objectives**: After completion of this program, the graduates / students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II : Successful Career	Deliver professional services with updated technologies in C**omputer Science** based career.
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.

3. Program Outcome(s): Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems.
PO2: Generate solutions by conducting experiments and applying techniques to analyze and interpret data
PO3: Design component, or processes to meet the needs within realistic constraints.
PO4: Identify, formulate, and solve problems using computational temperaments.
PO5: Comprehend professional and ethical responsibility in computing profession.
PO6: Express effective communication skills.
PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.
PO8: Actual hands on technology to understand it's working.
PO9: Knowledge of contemporary issues and emerging developments in computing profession.
PO10: Utilize the techniques, skills and modern tools, for actual development process
PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work
PO12: Research insights and conduct research in computing environment.

4. **Course Outcome(s):** Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

5. Mapping of PEO& PO and CO

Program Educational Objectives	Thrust Area	**Program Outcome**	Course Outcome
PEO I	Technical Expertise	PO1,PO2,PO3,PO6	All core courses
PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

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Program Structure of B.Sc. (Computer Science) SECOND YEAR * w.e.f-AY 2020-2021

(* As per the strict guidelines of the UGC, New Delhi for syllabi at Model colleges)

Second Year B.Sc. (Computer Science)-NMDC						
Third Sem	**Language Curriculum**		MCBCS-E-301	Functional English	4	**30**
			MCBCS-SL-302	Second Language (Marathi/Hindi/)	4	
	Major Curriculum	**Major Core**	MCBCS-303T	RDBMS	5	
			MCBCS-304T	Java Programming	5	
		Major Supportive	MCBCS-305T	Data Structure and Algorithms	4	
		Major Applied	MCBCS-306P	Expression (Training), Creation (Project) and Self Evaluation based on MCBCS-303T & MCBCS-304T [Comp. Lab. 3]	4	
	Life Skill Curriculum	**Job Oriented Soft Skill**	MCBCS-307	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR Numerical Abilities	2	
		Value Oriented Courses	MCBCS-308	Cyber Forensics	2	
Fourth Sem	**Language Curriculum**		MCBCS-E-401	Functional English	4	**30**
			MCBCS-SL-402	Second Language (Marathi/Hindi/)	4	
	Major Curriculum	**Major Core**	MCBCS-403T	Windows Programming using VB	5	
			MCBCS-404T	Advanced Operating Systems	5	
		Major Supportive	MCBCS-405T	Data communication and Networking	4	
		Major Applied	MCBCS-406P	Expression (Training), Creation (Project) and Self Evaluation based on MCBCS-403T [Comp. Lab.4]	4	
	Life Skill Curriculum	**Job Oriented Soft Skill**	MCBCS-407	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR Logical Reasoning	2	
		Value Oriented Courses	MCBCS-408	Multimedia Development	2	

Question paper Format

Note: 1) Q. No. 1 is compulsory and from Q. No. 2 to Q. No 8 solve any four.

2) All questions carry equal marks.

Q. No.	**Format**	**Marks**
1.	Write a short note on following: a) b) c) d) e)	2 x 5 = 10
2.	Brief Question	10
3.	Brief Question	10
4	Brief Question	10
5.	Write brief note on the following (Solve any two) a) b) c)	5*2 = 10
6.	Brief Question	10
7.	Brief Question	10
8.	Brief Question	10

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Syllabus for B.Sc. (CS) III Semester

Paper No.: MCBCS- E-301 **Functional English**
Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Lectures: 60

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) III Semester

Paper No.: MCBCS-SL-302 **Second Language (Marathi/Hindi/)**

Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Lectures: 60

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) III Semester

Paper No.: MCBCS-303T **RDBMS**
Internal : 75 University: 50 Total: 125 Marks Credits: 5
Hours per Week : 4 Total Lectures: 60

Course Objectives:

- To understand the different issues involved in the design and implementation of a Relational
- database management system.
- To study the physical and logical database designs, relational data modelling.
- To understand the concept of query optimization and advance data normalization.
- To understand mechanism for Transaction Processing and database recovery methods.

UNIT I

Interactive SQL

Oracle & Client-Server Technology, DDL: Naming Rules and Conventions, Data types, Constraints, Creating Table, Displaying Table Information, Altering an Existing Table, Dropping a Table, Renaming a Table, DML, DCL statements, DDL Commands : CREATE, ALTER, DROP for tables, DML Commands; SELECT, INSERT, DELETE and UPDATE, order

UNIT II

More on SQL

Computations on Table Data, Oracle Dual Table, Sysdate, Oracle Functions: Numeric function : ABS, MOD, FLOOR, CEIL, TRUNC, SQRT, SIGN, SIN, COS, LOG, EXP, LEAST, GREATEST Group functions: AVG, MAX, MIN, SUM, COUNT, Character function : LENGTH, LOWER, UPPER, INITCAP, INSTR, SUBSTR, LPAD, RPAD, LTRIM, RTRIB, DECODE, SOUNDEX, Conversion function: To-NUMBER, To-CHAR' ,, Data Constraints, Grouping Data from Tables, Manipulating Dates, Subqueries, joins, Study of the clauses: Union, Intersect, Minus

UNIT III

SQL Performance Tuning

Indexes: too many indexes on a table, categories of Index based on uniqueness of Indexed column: Duplicate Index, Unique Index
ROWID: Extended & Restricted ROWID
Sequences: Increment by, Max value, min value, Cycle, no cycle, Insert Sequence, Alter Sequence, Drop Sequence
Views: Update View, Insert View, Modify View, Delete View, Drop View.

Unit-IV

Introduction to Pl/SQL: Introduction, The Generic PL/SQL Block, Oracle Transaction, Constants and variables, Data types, control structure, Introduction to Cursor & Locks, Introduction to Database Objects: Stored Procedures and Functions, Database Triggers

Reference Books: -

1) Database System Concepts By Henry korth and A. Silberschatz
2) An Introduction to Database System by Bipin Desai
3) File Structure by Michael J. Folk, Greg, Riccardi

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New Model Degree College, Hingoli

Syllabus for B. SC. (CS) III Semester

Paper No.: MCBCS-304T **Java Programming**
Internal : 75 University: 50 Total: 125 Marks Credits: 5
Hours per Week : 4 Total Lectures: 60

Course Objectives:
Students will be able:

- To Interpret and apply core java programming concepts to the real world problem.
- Apply knowledge of Packaging and Exception Handling to make complete Java Projects.
- Apply concept exception handling, packages to enhance Java Projects.

UNIT - I

Introduction
Introduction to Java, Java History, Java Features, Java Virtual Machine, How Java differ from C and C++, Java and Internet, Java and WWW.

Basics of Java
Data types, Variables, Constants, Operators, Control statements, input and output statement, Arrays

String
Creating String, String Class Method, String Comparison, Immutability of String, String buffer, Creating String buffer Objects, String buffer Class Method, Wrapper Class,

UNIT - II

Class, Object and Methods
Classes, Objects, Constructors, Overloading method, Access control, Static member,
Final- variables, methods and class.
Inheritance - Overriding methods - abstract class and methods Polymorphism- Static and dynamic

UNIT - III

Packages and Interfaces
Interfaces , Multiple inheritance using Interfaces, Packages , types of packages, JAR file, Access protection , Importing packages,

Exception Handling
Exception Handling fundamentals, Exception types, uncaught exceptions, using try and catch, Multiple
Catch clauses, Nested try statements, throw, throws, finally, Java's Built in Exceptions

UNIT - IV

Threads
Single tasking, multi tasking, use of threads, creating a thread and runnig it, terminating the thread, single tasking using a thread, multi tasking using threads, multiple threads acting on single object, thread class methods.

Reference Books :

1. Programming with Java - A primer-By E. Balagurusamy (Tata Me Graw Hill)
2. Java 2 Complete Reference.
3. Core Java- An integrated Approach by Dr. R. Nageswara Rao.
4. Naughton and H.Schildt - "Java 2 - The complete reference" - Fourth edition.-2000
5. S.Horstmann, Gary Cornell - "Core Java 2 Volume I - Fundamentals" -Addison Wesley - 2001
6. Arnold and J.Gosling - "The java programming language" - Second edition Art
7. Gittleman – "Ultimate Java Programming" –Wiley Publications-2002

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Syllabus for B.SC. (CS) III Semester

Paper No.: MCBCS-305T **Data Structure and Algorithms**
Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 5 Total Lectures: 60

Course Objectives:

- Understand the use and working of the various data structures.
- Learn to be able to build own algorithms and pseudocodes for the various applications of the basic data structures.

Unit – I

Introduction: Basic Terminology, Elementary Data Organisation, Abstract Data Types, Data Structures, Data Structure operations, Algorithms: Complexity, Time-Space Tradeoff.

Unit – II

Arrays, Records and Pointers: Linear array, Representation in Memory, Traversing, Insertion and deletion of elements from linear array, Multidimensional array, Pointer, Pointer array, Record structure, Representation of records in memory; parallel arrays, matrices, sparse matrices.

Unit – III

Linked Lists: Introduction, Representation in memory, Traversing & Searching a linked list, Memory allocation; garbage collection, Insertion & Deletion, Header linked list, Two way linked list.

Stack, Queues and Recursion: Stack: Push, Pop, Array representation, Linked list representation, Arithmetic Expression; polish notation, Recursion, Queues, Linked representation, Traversing, insertion, deletion, Dequeues, Priority Queues.

Unit – IV

Trees: Introduction, Binary tree, Representation in memory, traversing using stack, Header nodes; threads, Binary search tree, Searching, insertion & deletion from binary search tree.

Graph: Introduction, Terminology.

Sorting and Searching algorithms: Introduction, Sorting: Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort, Quick Sort, Heap Sort, Searching: Linear, Binary search

Reference Books :

1. Data Structures, Seymour Lipschutz, The McGraw-Hill
2. Data Structure and algorithms, Alfred V. Aho, Pearson
3. An Introduction to Data structures with application, Jean-Paul Tremblay, Tata McGraw-Hill
4. Data Structure and program design in C, Rbert L. Bruse, PHI

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Syllabus for B.Sc. (CS) III Semester

Paper No.: MCBCS-306P **Expression (Training), Creation (Project) and Self Evaluation based on MCBCS-303T & MCBCS 304T**

Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Learning Hours: 120 (3 x 40) in Comp. Lab.

Unit – I (Internal: 20 Marks)

Assignment Expression: Training for Assembly programming, Training for Java Programming and Oracle.

Unit –II (Internal: 20 Marks)

Creation: Individual Minor Project using Java language.

Unit – III (Internal: 10 Marks)

Self Evaluation: Based on checklist provided by instructor.

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New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) III Semester

Paper No.: MCBCS-307 **University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR Communication Skills – 2**

Credits: 2 (Internal)

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New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) III Semester

Paper No.: MCBCS-308 **Cyber Forensics** Credits: 2 (Internal)

Course Objectives: The student should be made to:

- Learn the security issues network layer and transport layer.
- Be exposed to security issues of the application layer.
- Learn computer forensics.
- Be familiar with forensics tools.
- Learn to analyze and validate forensics data.

UNIT I : NETWORK LAYER SECURITY &TRANSPORT LAYER SECURITY

IPSec Protocol – IP Authentication Header – IP ESP – Key Management Protocol for IPSec.Transport layer Security: SSL protocol, Cryptographic Computations – TLS Protocol.

UNIT II : E-MAIL SECURITY & FIREWALLS

PGP – S/MIME – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls – Firewall designs – SET for E-Commerce Transactions.

UNIT III : INTRODUCTION TO COMPUTER FORENSICS

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques – Incident and incident response methodology – Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. – Forensics Technology and Systems – Understanding Computer Investigation – Data Acquisition.

References

- John R.Vacca, "Computer Forensics", Cengage Learning, 2005
- Richard E.Smith, "Internet Cryptography", 3rd Edition Pearson Education, 2008.
- Marjie T.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.

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Syllabus for B.Sc. (CS) IV Semester

Paper No.: MCBCS- E-401 **Functional English**

Internal : 50 University: 50 Total: 100 Marks Credits: 4

Hours per Week : 4 Total Lectures: 60

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New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) IV Semester

Paper No.: MCBCS-SL-402 **Second Language (Marathi/Hindi/)**

Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Lectures: 60

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New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) IV Semester

Paper No.: MCBCS-403T **Windows Programming using VB**
Internal : 75 University: 50 Total: 125 Marks Credits: 5
Hours per Week : 4 Total Lectures: 60

Course Objectives:

- Students will be able to Construct a Visual Basic .NET program using Microsoft Visual Studio, Create basic Visual Basic .NET applications, basic programming fundamentals such as variables, constants, selection statements, loops, procedures and functions
- Students will develop an algorithm to solve a given problem and translate it into a working VB .NET program.

UNIT I

Introduction to Vb.Net, Basic Syntax of VB.Net, Hello world example, Compile & Execute VB.Net Program, Identifiers, Keywords, Data type in Vb. Net, Type Conversion Functions in VB.Net, variables, constant, modifiers.
A statement in Vb. Net: Declaration and Executable statements. VB. Net Operators

UNIT II

Decision Making Statement: If...then, If...Then statement, nested If, A Select Case, nested Select Case, Loop Control Statement: Do Loop, For...Next, For Each...Next, While... End While, With... End With, Nested loops
Strings Arrays, Date & Time, Collections, Function, Classes and Object, Exception Handling, File Handling.

UNIT III

GUI Programming: Introduction to windows application, Understanding Solution Explorer, Understanding Visual Design surfaces, Understanding Properties window, output window, error list window. Creating a new project
Basic Controls: Control Properties, Control Methods, Control Events, Forms, Textbox, Label, Button, ListBox, ComboBox, Radio Button, Checkbox, PictureBox, ProgressBar, ScrollBar, DateTimePicker, Tree View, List view, Dialog Boxes, Advanced Form, Event Handling.

Unit IV

Database Programming with Vb.net: Database Access, ADO. Net Object Model, Data Provider, Dataset, OLEDB, Connecting a Database, SQLDB
Crystal Report : Connection to Database, Table, Queries, Building Report, Modifying Report, Formatting Fields, Publishing and exporting reports.

Reference Books:

1. Visual Basic 2010 programming Black Book, by Kogent Learning Solutions, Wiley India
2. Visual Basic 2010 Step By Step, Michael Halvorson, PHI

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New Model Degree College, Hingoli

Syllabus for B. SC. (CS) IV Semester

Paper No.: MCBCS-404T **Advanced Operating Systems**
Internal : 75 University: 50 Total: 125 Marks Credits: 5
Hours per Week : 4 Total Lectures: 60

Course Objectives:

- To introduce students the basic functioning of Advance operating systems as resource manager and its Salient features. Also to study about file system in real time operating system.

Unit – I

Introduction: Definition, Main Function of Operating System, Measuring System Performance, Basic Concepts and Terminology, Operating System as Resource Manager, Operating Systems – Hierarchical and Extended Machine View

Unit – II

Memory management: Single Contiguous Allocation, Introduction to Multiprogramming, Partitioned Allocation, Relocatable Partitioned Memory Management, Paged Memory management, Demand – Paged Memory Management, Segmented Memory Management, Segmented and Demand-Paged Memory Management.

Unit – III

Processor Management: State Model, Job Scheduling, Process Scheduling, Process Synchronization

Unit – IV

Device management: Techniques for Device Management, Device Characteristics, Channels and Control Units
File Management: Introduction, A Simple File System, Symbolic File System, Logical and Physical File System.

Unit – V

Some Popular Operating Systems: Unix, MS-DOS, MS-Windows, Windows NT, Linux.

Reference Books :

1. Operating Systems, Stuart Madnick & Donovan, Tata McGraw Hill
2. Operating Systems, Achyut Godbole, Tata McGraw Hill
3. Operating Systems, Harvey Deitel & Choffnes, Pearson
4. Operating Systems, Milan Milenkovic, Tata McGraw Hill

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New Model Degree College, Hingoli

Syllabus for B.SC. (CS) IV Semester

Paper No.: MCBCS-405T **Data communication and Networking**
Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Lectures: 60

Course Objectives:

- The students will be able to:
- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.

UNIT I

Introduction - Data Communication, Componnents, Data Representation, Data Flow, Networks, Physical Structures, Topology, Categories of Networks, Internet, Intranet, Protocols and Standards.
Network Models: Layered Tasks, The OSI Model, TCP/IP Models, Addressing
Physical Layer – Analog and Digital Data, Bandwidth, Bit Rate, Bit Length, Analog VS Digital, Transmission Impairment, Data Rate Limits, Performance
Digital Transmission – Line Coding (Unipolar, Polar, Biphase), Analog to digital conversion, PCM, Transmission Modes,
Analog Transmission – Digital to analog conversion(ASK,FSK,PSK, QAM), Analog to Analog conversion

UNIT II

Multiplexing – FDM, WDM, Synchronous TDM (time slots & frames, interleaving, data rate management),
Spread Spectrum – FHSS, DSSS
Transmission Media – Guided & Unguided Media, Switching – Switching, Circuit-Switched Networks, Datagram networks, Concept of Virtual circuit networks, structure of circuit switch & packet switch, Concepts of DSL & ADSL, Digital Subscriber Line.

UNIT III

Data Link Layer –Error correction & detection, Types of errors, Redundancy Detection VS Correction, Block Coding:Hamming Distance, Minimum Hamming Distance

Data Link Control & Protocols – Framing, Flow & Error Control, Protocols, Simplest Protocol, Stop-N-Wait Protocol, Piggybacking, HDLC Configuration and Transfer Modes, Frames, Control Field

UNIT IV

Multiple Access – Random(CSMA), Controlled(Reservation, Polling, Token Passing), Channelization(FDMA, TDMA, CDMA)
Network Layer: IPv4 and IPv6 Addresses
Wireless LAN - Introduction to WLAN(Architecture, Hidden, Exposed Station Problem), Introduction to Bluetooth & Architecture, Cellular telephony, Concept of 1G, 2G, 3G cellular telephony , Connecting Devices – Repeaters, Hubs, Bridges, Spanning tree algorithm,
Two & Three layer Switches, Routers, Gateways, Backbone networks, Concept of VLAN
Application Layer: Name Space, Domain Name space, DNS in the Internet
FTP, WWW and HTTP: Architecture, Web Documents, Proxy Server,

Reference Books: -

1) Data Communication & Networking (Forouzan), Fourth Edition Tata McGraw-Hill Education, 2007
2) Computer Networks and Internets - Douglas Comer, Prentice Hall
3) Computer Networks - Andrew Tanenbaum, Prentice Hall

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) IV Semester

Paper No.: MCBCS-406P **Expression (Training), Creation (Project) and Self Evaluation based on MCBCS-403T**

Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Learning Hours: 120 (3 x 40) in Comp. Lab.

Unit – I (Internal: 20 Marks)

Assignment Expression: Training for Assembly programming, Training for VB Programming.

Unit –II (Internal: 20 Marks)

Creation: Individual Minor Project using VB language.

Unit – III (Internal: 10 Marks)

Self Evaluation: Based on checklist provided by instructor.

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) IV Semester

Paper No.: MCBCS-407 **University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR Communication Skills – 2**

Credits: 2 (Internal)

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) IV Semester

Paper No.: MCBCS-408 **Multimedia Development** Credits: 2 (Internal

Course Objectives

This course introduces elementary concepts in multimedia, so as to familiarise students with the mechanism of multimedia technologies. It covers the fundamental concepts of multimedia and practice. It guides students to create and bring together many media elements and components into a computer-based presentation or application. This course also covers media elements, production, copyright, authoring tools, product design and development process. It is expected that participants will have a basic knowledge in multimedia technologies after completing the course.

Introduction to Multimedia

What is multimedia? Benefits of multimedia, multimedia applications development process, planning and costing, design and production, testing, delivery, design and user interface, balanced layout, unified piece, metaphor, template, interactivity, web accessibility

Multimedia Element- Text:

Typography, style, size and spacing ,alignment ,portable document format

Multimedia Element - Graphics:

Image types, image quality, image file size, colors, graphics card, graphical software and file formats

Multimedia Element –Animation:

Sampling rate and playback rate, cell animation, frame-based animation, animation effects, animation software and file formats

Multimedia Element- Sound:

Basic principles of sound, sound quality, digital audio file size, audio compression, web audio, sound card, digital audio software, media players and file formats

Multimedia Element -Video:

Analog video and digital video, video quality, video file size, video compression, web video, video capture card, video editing software and file formats

References:

1. Labrecque, J., Learn Adobe Animate CC for Interactive Media, Peachpit Press, 2016.
2. Vaughan, T., Multimedia: Making It Work 9th ed., McGraw Hill, 2014.