।। 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 B. Sc. Computer Science III year पदवी स्तरावरील CBCS Pattern नुसारचा अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, मा. विद्याशाखेने **दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व दिनांक १२ जून २०२१ रोजी संपन्न झालेल्या ५१ व्या मा. विद्या परिषद बैठकीतील विषय क्र. २६/५१–२०२१**च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या न्यु मॉडल डिग्री कॉलेज हिंगोली येथील **विज्ञान व तंत्रज्ञान विद्याशाखेतील B. Sc. Computer Science III year या पदवी स्तरावरील C.B.C.S. (Choice Based Credit System) Pattern** नुसारचा अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्यात येत आहेत.

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२१–२२/८८

दिनांक : २४.०७.२०२१.

स्वाक्षरित
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
७) अधीक्षक, परिक्षा विभाग विज्ञान व तंत्रज्ञान विद्याशाखा प्रस्तुत विद्यापीठ.

Swami Ramanand Teerth Marathwada

University's

New Model Degree College, Hingoli - 431513

Syllabus of Bachelor in Computer Science

(B.Sc. in Computer Science)

Third Year

With effective from 2021-2022 and onwards

Swami Ramanand Teerth Marathwada University,

Nanded

A Candidate shall be admitted to the I year of the B.Sc. in Computer Science (B.Sc. in C.S.) degree course only if he/she satisfies the following condition:

1. He/ She must have passed the higher secondary (multipurpose) examination conducted by H.S.C. board Government of Maharashtra with science / technical subjects Or an Examination of any statutory University and Board recognized as equivalent thereto.

OR

He / She must have passed examination prescribed at the end of second year of the junior college conducted by the H.S.C. board, Government of Maharashtra with English, Second language, Physics, Chemistry, Mathematics and or Biology or one of the technical subjects prescribed at the said examination as the optional or elective subjects or an examination recognized as equivalent thereto.

OR

Candidate having offered prescribed vocational course (MCVC) with Computer techniques/I.T./Electronics.

OR

Three years Diploma Course in engineering conducted by the board of technical Education, Maharashtra State.

2. He/ She must have passed at qualifying examination.

A candidate who has passed the B.Sc. in Computer Science examination of this university may be allowed to present himself subsequently at the degree examination in a subject or subjects other than those he has taken earlier provided that he puts in three years of attendance as a regular candidate for First, Second and Third year in the subject or subjects concerned excluding compulsory English, Second Language and remaining optional subject(s).

A candidate shall not be allowed to appear for such examination if he has passed the higher examination.

The Degree of Bachelor of Science (Computer Science) shall be conferred on candidate who has pursued a regular course of study consisting of six semesters in the relevant subject as prescribed and has appeared at the end examination and passed under the credit based system in all the examination prescribed for the Degree course in the faculty.

The pattern of the examination and the scope is indicated in the syllabus:

- The Number of students in a theory class shall not exceed 60.
- Maximum number of students in a batch for practical's in first four semesters shall consist of 20 students and for fifth & sixth semester the batch shall consist of 15 students.
- The rules for admission to the subsequent (next) semesters will be the same as per the University guidelines.
- For Each course the concerned teacher will have to conduct Class tests after completion every 02 units. The mark list of the same is to be submitted to the university authority within 7 working days after the completion of class tests.
- Final Examination will be conducted by the college based on the complete syllabus.
- Final Practical Examination will be conducted by the university and examiners will submit the marks in the prescribed format of students for practical examination to the university.

Student Intake Capacity:

The intake capacity for B.Sc. in Computer Science is 60 students in the first year.

Scheme of Evaluation (Marks Distribution)

Internal : 50 Marks University: 50 Marks

Total: 100 Marks Credits: 5

Hours per Week : 5 Total Lectures: 60

A) Internal : Total 50 Marks

Sr. No.	Title	Marks
1	Class Test I	15
2	Class Test I	15
3	Assignment	20
Total		50 Marks

B) University Assessment: Total 50 Marks

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

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.SC. (CS) V Semester

Paper No.: MCBCS-501T **Web Programming Techniques**

Internal : 75 University: 50 Total: 125 Marks Credits: 5
Hours per Week : 4 Total Lectures: 60

Course Objectives:
To learn the basic web concepts and Internet protocols. To familiarize with Scripting Languages. To study DHTML, XML,Vb script and Java script.

Unit – I

Introduction to Web Designing
Web page, Website, Web browser, www, Developing web Documents-Web design process. Publishing documents: Web publishing. Maintaining documents: maintenance phases of web page.

HTML documents
Overview of HTML, Rules of HTML documents, Structure of HTML documents document types.

Unit –II

HTML Markup tags: Tags-Definition, Basic Tags-HTML, HEAD, TITLE, BODY. Paragraph Tags, List tags, Horizontal Rule Tag, Headings Tags, Block quote Tags, Address Tags, FONT Tag, PRE tag, DIV tags, SPAN tag& other different formatting tags.
Linking in HTML: U.R.L. concept, Hyperlink (Anchor) Tag & it's all attributes, Creating Email Hyperlinks (using mailto anchor).

Unit – III

Images in HTML:
Introduction: Image & image formats, <img> tag& it's all attributes, Inline & Floating Images, Using Images as links.
Tables in HTML: Introduction, Table Tags:- TABLE, TR, TH, TD & all Attributes, Row span, Cols pan, Cell spacing, Cell padding, Table examples
Frames in HTML:
Overview, FRAMESET & FRAME tags & its attributes, Simple frame Examples, Use of <noframe> tag, Frame targeting, Floating frames.
Forms in HTML:
Introduction to forms, FORM tag& it's attributes (Action, Enctype, Method, Name), Simple form examples, Form controls: Text Field, Password Field, Multiline Text Area, Drop, Down List, Check Box, Radio Buttons, Scrolled List, Reset Button, Submit button, File Field.

Unit – IV

DHTML: Introduction, DHTML, Document object model (DOM), Introduction to Cascading Style Sheets (CSS).
VB Script:
Introduction, Adding script to documents, Data types, operators. Variables: Global & local variables, Input and output statements, Built in functions, Arrays. Control statements-If statement, If-Then-Else, Nested If, Select Case Statement. Looping statements: For…Next, Do-while, Do-until statements.
JAVA Script: Introduction, Basics, Data Types & variables, Expressions & Operators
Reference Books :
1. HTML completes 2nd Edition-BPB Publication.
2. The complete Reference (HTML & XHTML)-4th Edition by Thommas A Powel (Tata McGraw Hill publication.)
3. VBScript-Interactive course – By Noel Jerke, Michael Hatmaker, Jonny Anderson. (Techmedia)
4. JavaScript-Interactive course –By Arman Danesh (Techmedia).

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.SC. (CS) V Semester

Paper No.: MCBCS-502T **C# Programming**
Internal : 75 University: 50 Total: 100 Marks Credits: 5
Hours per Week : 4 Total Lectures: 60

Course Objectives:
Students will be able to know the c# environment, handling the array, class and objects.

Unit – I

Understanding .NET: The C# Environment

The .NET framework, The Common Language Runtime(CLR), Common Type System (CTS), Common Language Specification (CLS), Framework Base Classes, Benefits of the .NET Approach, What is C#, C# and the .NET, Characteristics of C#

Unit – II

Overview of C#

A Simple C# program, Namespaces, Literals, Variables, Data types: Value types, Reference types, Boxing and Unboxing, Type conversions: Implicit and Explicit Casting, Operators, Control and Looping Statement

Handling Arrays, Structures and enumerations

One, Two-dimensional arrays, Variable size arrays or *jagged array,* The system. Array class, Structures, Structure with methods, Enumerations, Enumerator initialization, Enumerator base types

Unit – III

Methods ,Classes and Objects

Introduction to methods, The main method, Invoking methods, Method parameters: Pass by value, Pass by reference, The output parameters, Variables argument lists, Methods overloading, Constructors, Destructors, Type of constructor: Static , Private, Copy constructors, Overloaded constructors, Defining a class: Adding variables, Adding methods, Member access modifiers, Objects, Static members, Constant ,Read only member

Unit – IV

Manipulating Strings

Creating strings,String methods, Inserting, Comparing strings, Finding substrings, Mutable strings, Arrays of strings, Regular expressions

Inheritance, Interfaced and Polymorphism

Classical inheritance, Defining a subclass, Visibility control, Multilevel and Hierarchical inheritance, Overriding methods, Hiding methods, Abstract classes, methods, Sealed classes, methods: preventing inheritance, Interfaced: Multiple Inheritance, Defining, Extending, Implementing interfaces, Interfaces and inheritance, Explicit interface implementation, Abstract class and interfaces, Polymorphism

Reference Books :

1. E. Balagurusawmy " Programming in C#" , Third Edition, McGraw Hill.
2. S. Thamarai Selvi and R. Murugesan "A Textbook on C# ", Pearson Education,2003.
3. Stephen C. Perry " Core C# and .NET", Pearson Education,2006.
4. Jesse Liberty, "Programming C#", Second Edition, O'Reilly Press, 2002.
5. Robinson et al, "Professional C#", Fifth Edition, Wrox Press, 2002.
6. Herbert Schildt, "The Complete Reference: C#", Tata McGraw Hill, 2004.

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.SC. (CS) V Semester

Paper No.: MCBCS - 503T **Software Engineering**
Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 5 Total Lectures: 60

Course Objectives:

- Students understand the concepts of Software Engineering
- Students will understand various process models used in practice
- To know about the system engineering, agile engineering and quality assurance.

Unit–I

Introduction Software Engineering:
The Nature of Software: Define Software, Software Applications, Legacy software, The Software Process, Software Myths

Unit–II

The software Process and Process Models
Software Engineering: A Layered Technology, Software process framework, Capability Maturity Model Integration (CMMI), Personal & team process models: Personal Software Process (PSP), Team Software, Process (TSP), Prescriptive Process Models: The Waterfall Model, Incremental Model, Process Model, RAD Model, Evolutionary Process Model: Prototyping Model, Spiral Model

Unit–III

Agile Development
Introduction to Agility, Agile Process, Extreme Programming (XP),
Other Agile Process Model: Adaptive Software, Development (ASD), Scrum, Dynamic System, Development Method (DSDM), Crystal, Feature Driven Development (FDD), Agile Modeling (AM)

Unit–IV

Software Project Management Concepts:
The Management spectrum, The People Problem, The Process, The Project Software, Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

Quality Assurances
Quality Concepts: Quality control, Quality assurance, Cost of quality, Software Quality Assurance, Software reliability

Testing Techniques
Software Testing Fundamentals: White Box Testing, Black Box Testing

Reference Books:
Roger S. Pressman - Software Engineering A Practitioner's Approach -5th edition, McGraw

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New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) V Semester

Paper No.: MCBCS-304P **Expression (Training), Creation (Project) and Self Evaluation based on MCBCS-301T & MCBCS 302T**

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 Web Designing, Training for C# Programming

Unit –II (Internal: 20 Marks)

Creation: Individual Minor Project using HTML and C# Programming.

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) V Semester

Paper No.: MCBCS - 505 **Software Project Management**

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

Hours per Week : 4 Total Lectures: 60

Unit–I

Introduction to Software Project Management

Introduction, Why is Software Project Management Important? What is a Project? Software Projects versus Other Types of Project, Contract Management and Technical Project Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Management Control, Project Management Life Cycle

Selection of a Project Approach

Introduction, Build or Buy? Choosing Methodologies and Technologies, Software Processes and Process Models, Choice of Process Models, Structure versus Speed of Delivery, Selecting the Most Appropriate Process Model.

Unit–II

Project Estimation Techniques

Introduction, Where are the Estimates Done? Problems with Over- and Under-Estimates, The Basis for Software Estimating, Software Effort Estimation Techniques, Bottom- up Estimating, The Top-down Approach and Parametric Models

Activity Planning: Introduction, Objectives of Activity Planning, When to Plan, Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, Formulating a Network Model, Adding the Time Dimension, The Forward Pass, Backward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities, Activity-on-Arrow Networks.

Unit–III

Risk Management: Introduction, Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule.

Resource Allocation: Introduction, Nature of Resources, Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedules, Scheduling Sequence.

Unit–IV

Monitoring and Control: Introduction, Creating the Framework, Collecting the Data, Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management.

Managing Contracts, Managing People in Software Environments

Reference Books:

1. Bob Hughes, Mike Cotterell, Rajib Mall, "Software Project Management" TMH publisher, 2018.

2. Shailesh Mehta "Project Management and Tools & Technologies – An overview" SPD publisher, 2017.

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New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) V Semester

Paper No.: MCBCS-506 **University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR System Analysis and Design (SAD)**

Credits: 4

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) V Semester

Paper No.: MCBCS-507 **Advanced Java Programming**

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

Hours per Week : 4 Total Lectures: 60

Course Objectives:

Students will be able to:

- To Interpret and apply core java programming concepts to the real world problem.
- Apply knowledge of multithread programming, AWT, applet class, servlet, java server pages to make complete Java Projects.

Unit – I

Multithreaded Programming

Life cycle of thread, Using thread methods, Thread Exception, Thread priority, Implementing the 'Runnable' interface.

Introduction To AWT

AWT classes, Components, Window and Frame, Closing the Frame, The delegation event model, Working with graphics, color, fonts, Listeners and Listener Methods, Push Button, Check Boxes, Text Field, Text Area, Label, Choice Class, List Class, Scrollbar Class, Keys on Keyboard, Working with Several Frame, Understanding layout managers

Unit – II

A Tour of Swing

Java Foundation Classes (JFC), Javax.swing and MVC, Window panes, Classes of javax.swing, Creating Frame in Swing, Displaying Text in frame, JComponents Class Method, Creating push Button, Displaying in Image in Swing, Creating Components in Swing, JTable Class, JTabbedpane Class, JSplitPane Class, JTrees Class, JcomboBox Class, JList Class, JMenu Class, JToggale Button Class, JProgressBar Class, JToolBar Class, JColorChooser Class, Handaling Keyboard and Mouse Event

Unit – III

The Applet Class

Applet basics, Applet architecture and use, Simple applet display method, Requesting repainting, The HTML APPLET tag, Passing parameters to applets.

Database Programming

JDBC, Stages in a JDBC Program: Registering the Drivers, Connecting The Database, Preparing SQL Statements, Retrieving Data from MySQL MS Access Database, Types of JDBC Drivers

Unit – IV

Servlets

The life cycle of a servlets, Using Tomcat for server development, A simple servlet, Using cookies, Session Tracking

Java Server Pages

Introduction to java server pages, A simple JSP example, Scripting.

Suggested Readings:

1.Core Java- An Itegrataed Aprrocach Dr. R Nagesswara Rao
2. Programming with java A Primer Fourth Edition by E Balagurusamy.
3. The Complet Reference Java Fifth Edition by Herbert Schildt(TATA McGRAW HILL)
4. Core Java VOLII 7th Edition by Cay S. Harstmann,Gary Carnell.
5. Core Servlets & Java Server Pages by Marty Hall,Larry Brown.

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.Sc. (CS) VI Semester

Paper No.: MCBCS-601T **Essentials of Computer Security**
Internal : 75 University: 50 Total: 125 Marks Credits: 5
Hours per Week : 4 Total Lectures: 60

Course Objectives:
Students will be able to:

- Policies of computer security
- Encryption techniques and key generation techniques.
- Authentication and security measures.
- Intrusion and filtering analysis.

Unit-I

An overview of Computer Security:
The basic components: confidentially, integrity, availability, Threads, Policy & mechanism, Assurance: specification, design, implementation, Operational issues: cost- benefits analysis, risk analysis, laws & customs Human issues: organizational problems, people problems
Network security policies:
Security policies: Definition, type of security policies, The role of Trust, type of access control, Example of academic computer security policy: general university policy, electronic mail policy,

Unit-II

Basic Cryptography:
What is Cryptography, Classical cryptosystem: Transposition Ciphers, Substitution Cipher: Vigenere Cipher, One-time pad, Public key cryptography,
Authentication:
Authentication basics, passwords: attacking a password system, countering password guessing: Random selection password, user selection password.
Biometrics: Fingerprints, Voices, Eyes, Faces,

Unit-III

Malicious Logic:
Introduction, Trojan Horses, computer viruses: boot sector infectors, executable infectors, multipartite viruses, TSR viruses, Stealth viruses, encrypted viruses, polymorphic viruses, micro viruses
Network Security:
Introduction, Policy development: Data classes, User classes, availability, consistency check, Network organization: Firewalls & proxies, Analysis of the network infrastructure: outer firewall configuration, inner firewall configuration,
Concept of Ethical Hacking

Unit-IV

Introduction
What is hacking, Hackers, types of hackers, why hackers hack? Prevention from hacker, steps performed by hackers, working of ethical hacker
Email Hacking
How email works? Email service protocol's, Email Security, email spaoofing, Methods to send fake Emails, email spaming, phishing, prevention from phishing, email tracing, keystroke loggers

Reference Books:

1. Introduction to Computer Security by Matt Bishop, Pearson
2. Cryptography & Network Security by Behrouz A. Forouzan 2nd Edition Mc Graw Hill

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Syllabus for B. SC. (CS) VI Semester

Paper No.: MCBCS-602T **Digital Image Processing**

Internal : 75 University: 50 Total: 125 Marks Credits: 5

Hours per Week : 4 Total Lectures: 60

Course Objectives:

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques, To study image restoration procedures
- To study the image segmentation and representation techniques, To study the Color image Processing.

Unit-I

Introduction: Definition, Origins, Examples: X-ray Imaging, Ultraviolet Band, Visible and Infrared Bands, Microwave Band, and Radio Band Imaging; Fundamental Steps, Components of an Image Processing System Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, A Simple Image Formation Model; Image Sampling and Quantization; Basic Relationships Between Pixels; Linear and Nonlinear Operations.

Unit-II

Image Enhancement in the Spatial Domain and Frequency Domain : Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Spatial Filters, Smoothening and Sharpening Combining Spatial Enhancement Methods and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

Image Segmentation: Detection of Discontinuities: Point, Line, Edge Detection; Edge Linking and Boundary Detection: Local Processing, Global Processing via the Hough Transform, Global Processing via Graph-Theoretic Techniques; Thresholding: Role of Illumination, Basic Global Thresholding, Basic Adaptive Thresholding, Optimal Global and Adaptive Thresholding.

Unit-II

Image Restoration: Model of the Image Degradation/ Restoration Process, Noise Models: Restoration in the Presence of Noise Only Spatial Filtering: Mean, Order Statistics, and Adaptive Filters; Periodic Noise Reduction by Frequency Domain Filtering: Bandreject, Bandpass, and Notch Filtering; Estimating the Degradation Function - Estimation by Image Observation, Experimentation and Modeling; Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Geometric Mean Filter; Geometric Transformations: Spatial Transformations, Gray-Level Interpolation

Unit-IV

Color Image Processing: Color Fundamentals, Color Models; Pseudocolor Image Processing; Full-Color Image Processing, Color Transformations: Formulation, Colour Complements, Color Slicing, Noise in Color Images. Morphological Image Processing: Preliminaries, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms: Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening, Skeletons, Pruning; Extensions to Gray-Scale Images.

Text Reference Books:

1. Gonzalez, R. C. and Woods, R. E. : Digital Image Processing, 2nd/3rd ed., Prentice Hall

2. Sonka, M., Hlavac, V., Boyle, R. : Image Processing, Analysis and Machine Vision (2nd edition), PWS Publishing,

3. Anil K. Jain : Fundamentals of digital image processing (2nd Edition), Prentice-Hall, NJ

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B.SC. (CS) VI Semester

Paper No.: MCBCS-603T **Web Development using PHP Programming**
Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Lectures: 60

Course Objectives:

- Students will be able:
- To know the advanced features of web development.
- To know the file handling, arrays, function, cookies, session.
- To know the database connection with programming.

Unit-I

What is PHP?
History of php, Why PHP?, Basic PHP Syntax, Data types, Variables constant, Operators, Strings, strlen() function, strpos() function.

Unit-II

Conditional Statements
Looping Statements
Arrays
Numeric Arrays, Associative Arrays, Multidimensional Arrays
Function
Introduction, Adding parameters, Return values, include() Function, require() Function Date() Function

Unit-III

File Handling
Opening a File, Closing a File, Check End-of-file, Reading a File Line by Line, Reading a File Character by Character, File Upload
Cookies
What is a Cookie? Create a Cookie, Retrieve a Cookie Value, Setting time in a cookie with PHP, Deleting a cookie, Creating session cookie, Working with the query string
Session
what is session?, Starting a session, Storing a Session Variable, Destroying a Session, Registering Session variables, working with session variables, destroying session passing session Ids

Unit-IV

MySQL Introduction
What is MySQL?, Create a Connection to a MySQL Database, Create Database and Tables, Insert Data Into a Database Table, Select Data From a Database Table, The WHERE clause Update Data In a Database, Delete Data In a Database

Reference Books: -

1. PHP and MySQL for Dynamic Web Site: Visual Quickpro Guide,second edition by Larry Ullman
2. Programming PHP by Rasmus Lerdorf, Kevin Totroe, Petar MacIntyre
3. PHP Web Services Wrox Publication
4. PHP Cookbook O'Reilly Publication
5. Learning PHP and MySQL O'Reilly Publication
6. www.php.net.in

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Syllabus for B.Sc. (CS) VI Semester

Paper No.: MCBCS-604P **Expression (Training), Creation (Project) and Self Evaluation based on MCBCS-603T**

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 Web Designing, PHP Programming and MySQL.

Unit –II (Internal: 20 Marks)

Creation: Individual Minor Project using PHP Programming and MySQL.

Unit – III (Internal: 10 Marks)

Self Evaluation: Based on checklist provided by instructor.

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Syllabus for B.SC. (CS) VI Semester

Paper No.: MCBCS-605 **Project Development activity and Seminar**

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

Hours per Week : 4 Total Lectures: 60

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Syllabus for B.Sc. (CS) VI Semester

Paper No.: MCBCS-606 **University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR Introduction to Open Source Software**

Credits: 4

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Syllabus for B.SC. (CS) VI Semester

Paper No.: MCBCS-607 **Software Quality Testing**
Internal : 50 University: 50 Total: 100 Marks Credits: 4
Hours per Week : 4 Total Lectures: 60

Course Objectives:

- Students will be able:
- To know the advanced knowledge software testing
- To know about the details of manual testing and automated testing techniques

Unit-I

Introduction to Software Testing:
What is testing, why testing, Error, fault and failure, Quality, system development life cycle (SDLC), Need of s/w testing, Verification & validation model,
Software Quality Assurance:
Definition of Quality, Formal approaches to SQA, Six-Sigma, Software safety, ISO 9000 Quality Standard, Review types : Informal Review, Technical or peer review, Walkthrough, Inspection, static analysis, Review meeting and reporting , Review guidelines & Review checklist,

Unit-II

Product metrics:
McCalls Quality factor, ISO 9126 quality factor, A framework for product metrics, The product metrics landscape, Class oriented metrics-CK metrics: WMC, DIT, NOC, CBO, RFC, LCOM

Unit-III

Software testing fundamentals:
Functional Testing (Black Box), positive & negative testing, Equivalence partitioning, BVA, Decision table based testing, Cause-Effect graphing,
Structural Testing (White Box), static testing: Desk checking, code walkthrough, code inspection, Code Coverage testing: Statement coverage, Branch & condition coverage, Path coverage, Basic path testing: flow graph notation, cyclomatic complexity.
Levels of Testing:
Unit Testing, Integration Testing, System Testing, Acceptance Testing, Alpha testing & Beta testing, Static vs. Dynamic testing, Manual vs. Automatic testing,

Unit-IV

Different types of Testing:
Function testing, Usability testing, Regression testing, Volume testing, storage testing, configuration testing, Recovery testing, Performance testing, Load testing, stress testing, Security testing, Installation testing
Test case Design:
Bug life cycle, Testing lifecycle, Test Cases – Test plan, Test case designing.
Computer Aided Software testing tools (CAST):. Benefits of automated testing, Win Runner: understanding the win runner testing tool,

References:

1. Software Engineering – A Practitioners Approach Roger S. Pressman, 5th Edition, Mcgraw Hill, International Education.
2. Software Testing Techniques, Barrios Bier, 2nd Edition, Van N Ostrand Reinhold.
3. Introducing Software Testing by Louise Tamres (Pearson pub)
4. Effective Methods for software Testing by William Perry

5. “The Art of Software Testing”, Glenford Myers, John Wiley & Sons Inc., New York.