।। 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

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे CBCS Pattern नुसारचे 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 **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०–२१ पासून लागू करण्यात येत आहेत.

1. B.Sc.-II Year-Biophysics	2. B.Sc.-II Year-Bioinformatics
3. B.Sc.-II Year-Biotechnology	4. B.Sc.-II Year-Biotechnology (Vocational)
5. B.Sc.-II Year-Food Science	6. B.Sc.-II Year-Botany
7. B.Sc.-II Year-Horticulture	8. B.Sc.-II Year-Agro Chemical Fertilizers
9. B.Sc.-II Year-Analytical Chemistry	10. B.Sc.-II Year-Biochemistry
11. B.Sc.-II Year-Chemistry	12. B.Sc.-II Year-Dyes & Drugs Chemistry
13. B.Sc.-II Year-Industrial Chemistry	14. B.C.A. (Bachelor of Computer Application)-II Year
15. B.I.T. (Bachelor of Information Technology)-II Year	16. B.Sc.-II Year-Computer Science
17. B.Sc.-II Year-Network Technology	18. B.Sc.-II Year-Computer Application (Optional)
19. B.Sc.-II Year-Computer Science (Optional)	20. B.Sc.-II Year-Information Technology (Optional)
21. B.Sc.-II Year-Software Engineering	22. B.Sc.-II Year-Dairy Science
23. B.Sc.-II Year-Electronics	24. B.Sc.-II Year-Environmental Science
25. B.Sc.-II Year-Fishery Science	26. B.Sc.-II Year-Geology
27. B.Sc.-II Year-Mathematics	28. B.Sc.-II Year-Microbiology
29. B.Sc.-II year Agricultural Microbiology	30. B.Sc.-II Year-Physics
31. B.Sc.-II Year Statistics	32. B.Sc.-II Year-Zoology

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२०–२१/**३३३**

दिनांक : १५.०७.२०२०.

स्वाक्षरित/–
उपकुलसचिव
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.

Swami Ramanand Teerth Marathwada University, Nanded
(NAAC Re-accredited with 'A' Grade)

Syllabus of

Second Year B.Sc. Software Engineering
(Revised CBCS pattern)

Introduced from Academic Year 2020-2021

B.Sc. Software Engineering

B.Sc. Software Engineering (3years) program / degree is a specialized program in computer software development essentials. It builds the student on studies in software development tools and techniques and to become competent in the current race and development of new software. The duration of the study is of six semesters, which is normally completed in three years.

CBCS pattern

The B.Sc. Software Engineering program as per CBCS (Choice based credit system) pattern, in which choices are given to the students under open electives and subject electives. The students can choose open electives from the wide range of options to them.

Eligibility and Fees

The eligibility of a candidate to take admission to **B.Sc. Software Engineering** program is as per the eligibility criteria fixed by the University. More details on admission procedure and fee structure can be seen from the prospectus of the college / institution as well as on website of the University.

Credit Pattern

Every course has corresponding grades marked in the syllabus structure. There are 24 credits per semester. A total of 144 credits are essential to complete this program successfully. The Grading pattern to evaluate the performance of a student is as per the University rules.

Every semester has a combination of Theory (core or elective) courses and Lab courses. Each theory course has 04 credits which are split as 03 external credits and 01 internal credit. The university shall conduct the end semester examination for 03 external credits. For theory internal credit, student has to appear for 01 class test (15 marks) and 01 assignment (10 marks). Every lab course has 02 credits which are split as 01 external credit and 01 internal credit. For lab internal credit, the student has to submit Laboratory Book (05 marks) and remaining 20 marks are for the Lab activities carried out by the student throughout the semester. For lab external credit, 20 marks are reserved for the examinational experiment and 05 marks are for the oral / viva examinations.

The open elective has 04 credits which are purely internal. If students are opting for MOOCs as open elective , then, there must be a Faculty designed as MOOCs course coordinator who shall supervise learning through MOOCS. This is intentionally needed as the MOOCs course coordinator shall verify the MOOC details including its duration, staring date, ending date, syllabus contents, mode of conduction, infrastructure feasibility, and financial feasibility during start of each semester. This is precautionary as the offering of the MOOCs through online platforms are time specific and there must be proper synchronization of semester duration with the MOOCs duration. Students must opt for either institutional / college level open elective or a course from University recognized MOOCs platforms as open electives.

The number of hours needed for completion of theory and practical courses as well as the passing rules, grading patterns, question paper pattern, number of students in practical batches, etc shall be as per the recommendations, norms, guidelines and policies of the UGC, State Government and the SRTM University currently operational. The course structure is supplemented with split up in units and minimum numbers of hours needed for completion of the course, wherever possible.

Under the CBCS pattern, students would graduate **B.Sc. Software Engineering** with a minimum number of required credits which includes compulsory credits from core courses, open electives and program specific elective course. All students have to undergo lab / practical activities leading to specific credits and project development activity as a part of professional UG program.

1. **B.Sc. Software Engineering Degree** / program would be of 144 Credits. Total credits per semester= 24
2. Each semester shall consist of three core courses, one elective course, one open elective course and two practical courses. Four theory courses (core+elective) = 16 Credits
3. Two practical / Lab courses= 4 Credits in total (02 credits each) , One Open elective= 4 credit
4. One Credit = 25 marks , Two Credits = 50 Marks, Four Credits = 100 Marks

PEO,POand CO Mappings

1. **Program Name** : B.Sc.(Software Engineering)

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 Software Engineering 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 software development processes.
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

Swami RamanandTeerthMarathwada University,Nanded

CBCS Revised Syllabus w.e.f. SY: 2020-21

Program: B.Sc. (Software Engineering) – Affiliated Colleges

Year	Semester	Course Category	Course Code	Course Title	Credits
Second	Third	Core Course	BSE-301	Operating System Concepts	04
		Core Course	BSE-302	Object Oriented Concepts	04
		Core Course	BSE-303	Programming using VB.NET	04
		Choose any one from the below Elective courses			
		Elective Subject	BSE-304 A	Compiler Designing	04
			BSE-304 B	Computer Graphics	
		Choose any one Open Elective courses			
		Open Elective	BSE-305 A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR	04
			BSE-305 B	Numerical Aptitude	
		Lab	BSE-306	C++ Programming	02
			BSE-307	VB.Net Programming	02
				Total	**24**
Second	Fourth	Core Course	BSE-401	Computer Networks	04
		Core Course	BSE-402	Introduction to Core Java	04
		Core Course	BSE-403	Internet Technology using PHP	04
		Choose any one from the below Elective courses			
		Elective Subject	BSE-404 A	Introduction to Multimedia	04
			BSE-404 B	Distributed Computing	
		Choose any one Open Elective courses			
		Open Elective	BSE-405 A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses	04
			BSE-405 B	Logical Reasoning	
		Lab	BSE-406	Java Programming	02
			BSE-407	PHP Programming	02
				Total	**24**

Code BSE-301	Third Semester	**Operating System Concepts**	Credits:04

Course Objectives:

- To provide users a convenient interface to use the computer system.
- To act as an intermediator between the hardware and its users, making
- It easier for the users to access and use other resources.
- To manage the resources of computer system.

Course Outcomes:

- To describes functions of operating system, system structure, process management, Multithreaded programming, deadlocks, memory management, file system.
- This course describes the fundamental concept behind operating system, and examines
- The ways that design goals can be achieved.

Unit I	**Introduction**

Definition and Responsibilities of OS, What operating system do, User view, System view, Computer System Architecture, Single Processes System, Multi Processes System, Operating System structure, An Operating System Resource Manager, Extended Machine Concept

Unit II	**System Structure**

Operating System Services, User Operating System Interface, Command Interpreter, Graphical User Interface, System Calls, Types of System Calls, Process Control, File Management, Device Management, Information Maintenance, Communication, Protection

Unit III	**Process Management**

Process concept, The process, Process state, Process Control Block, Process Scheduling, scheduling Queues, scheduler, Context Switching, Scheduling Criteria, Scheduling Algorithm, FCFS, SJF, Priority Scheduling, Round-Robin Scheduling

Unit IV	**Multithreaded Programming and Deadlocks**

Overview, Multithreading Models, Thread Libraries – Pthreads, Definition and conditions for deadlocks

Unit V	**Memory Management**

Introduction, Contiguous Memory Allocation, Memory allocation, Fragmentation, paging, Basic Method, Hardware support, Segmentation, Basic Method, Hardware support

Unit VI	**File system**

File concept, Access Methods, sequential, direct, Directory and Disk structure, Directory Overview, Single level Directory, Two level Directory, Tree structure Directory, Allocation Methods, Contiguous Allocation, linked allocation, indexed Allocation, Free space management, Bit vector, linked list, Grouping, Counting

Reference Books:

1. Operating system concepts – Abraham Silberschatz, Peter Galvin, Greg Gagne (Wiley India Edition 8th Edition)
2. Operating Systems – Stuart E Madnick, John J. Donovan (Tata McGraw-Hill Publishing Limited)
3. Operating Systems – AchyutGodbole, AtulKahate (McGraw-Hill Education Third Edition)

Code BSE-302	Third Semester	**Object Oriented Concepts**	Credits:04

Course Objectives:

- It is oriented programming language. In which we are able to develop OS and MAC operating system, application software and programming languages.
- Programming Language are also used to build students logic for programming.

Course Outcomes:

- To study of structure of programming languages, structure of c++ program.
- To study different programming concepts.
- To develop programs using operators and control statement.
- To describe an inheritance.
- Student are able to develop application software.

Unit I	**Introduction to OOP's**

Object Oriented Programming, Basic concepts of OOPS, Benefits of OOPs.

Unit II	**Introduction to C++**

Tokens Identifiers Keywords, Constant variable data types, Scope Resolution Operator, I/O statements Structure of C++ program, Control statements Looping, Type casting · Arrays, Pointer, References, Structure and Unions, Function: Call by value, Call by reference, Inline function, Default arguments, Function Overloading

Unit III	**Class & Object**

Define Class, Members Object, Visibility modes, Static members, Pointer to members, Pointer to objects, Constructors & Destructors, Friend Function.

Unit IV	**Operator Overloading & Type Conversions**

Concept of Operator Overloading, Unary & Binary operator overloading, Rules for Overloading, Type conversions – Basic to Class, Class to basic Class to Class

Unit V	**Inheritance & Polymorphism**

Concept of Inheritance, Types of Inheritance, Polymorphism, Virtual Base Classes, Pointer to Derived class, Virtual functions, Rules for Virtual function, Pure Virtual functions

Unit VI	**C++ I/O System**

C++ Streams Stream classes, Unformatted I/O operations, Formatted I/O operations, Manipulators, Opening and closing file, file modes, Updating file

Reference Books:

Sr.No.	Name of the Book	Author	Publication
1.	OBJECT ORIENTED PROGRAMMING WITH C++	E. BALGURUSWAMI	BPB Publication
2.	C++ COMPLETEREFERENCE	H. SHEILD	BPB Publication

Code-BSE 303	Third Semester	**Programming using VB.NET**	Credits:04

Course Objectives:

- The student will use Visual Basic.Net to build Windows applications using structured and object-based programming techniques.
  - Students will be exposed to the following concepts and skills
  - Analyze program requirements
  - Design/develop programs with GUI interfaces
  - Code programs and develop interface using Visual Basic .Net
  - Perform tests, resolve defects and revise existing code

Course Outcomes:

- Students will understand .NET Framework and describe some of the major enhancements to the new version of Visual Basic.
  - Students will describe the basic structure of a Visual Basic.NET project and use main features of the integrated development environment (IDE)
  - Students will create applications using Microsoft Windows Forms
  - Students will create applications that use ADO. NET

Unit I	**Visual Basic: The Language**

What is .Net, The Overview of .Net Framework, The Common Language Runtime, Variables, Arrays, Flow Control Statements, Subroutines & Function, Arguments passing mechanism & Event Handler Arguments, Passing an unknown number of arguments & Named arguments

Unit II	**Working with Forms**

The Appearance of the Form, Properties & Events of the form, Building Dynamic Form at Run Time, Designing Menus, Text Box. Control, The ListBox, CheckedListBox, &ComboBox Control, The Common Dialog Control, The Rich Text Control, The TreeView&Listview control

Unit III	**Custom Class**

Building & using Custom class, Inheritance, Polymorphism, MyBase&MyClass Keywords

Unit IV	**Handling Strings, Charters& Dates**

The Char & String Class, The DateTime Class

Unit V	**Working with Files & Folders**

Accessing Folders & Files, Directory Class, File Class, Directory Info class, FileInfo Class, Path Class, Accessing Files, File Stream Class, StreamReader Class, Stream Writer Objects

Unit VI	**Building Database Application with ADO.NET**

The Architecture of ADO.NET, Creating Dataset, Data binding, DataAdapter Object, The Command & Data Reader Objects, The Structure of Dataset, The DataForm Wizard, Transactions

Reference Books:

1. Mastering Visual Basic.Net, By EvangelosPatroutsos (BPB Publication)
2. Visual Basic. Net Programming, By Billy Hollis, Rockford Thotlog (Wrox Publication)
3. Professional VB .Net 2003, By Bill Evjen, Bills Hollis, (Worx Publication)
4. Visual Basic.Net Programming Black Book, By Steven Holzner
5. Beginning VB.Net (2nd Edition)

Code-BSE 304 A **Elective**	Third Semester	**Compiler Designing**	Credits:04

Course Objectives:

- To learn the process of translating a modern high-level language to executable machine Language code
- To learn different phases of compiler and how to implement them.
- To learn efficient machine Language Code Generation using the techniques of Optimization.

Course Outcomes:

- Upon completion of the subject, student will be able to:
  - Understand compiler and various phases in compilation.
  - Understand the importance of code optimization
  - Know about compiler generation tools and techniques
  - Introduce different translation languages

Unit I	**Introduction**

Introduction of Compilers and Translators, Need of translators, Phases of a compiler, Lexical analysis, Syntax analysis, Semantic analysis, Intermediate code generation, Code Optimization, Code generation, Compiler construction tools, A simple one pass compiler

Unit II	**Programming languages**

High - Level programming languages, Definitions of programming languages, The Lexical & syntactic structure of a language, Data elements,Data structures, Operators, Assignment, Statements

Unit III	**Lexical Analysis**

Role of a Lexical analyzer, Simple approach to the design of Lexical Analysis, Regular Expression, finite automata, A language for specifying lexical analyzer

Unit IV	**Syntax Analysis**

Role of Parser, Context free Grammar, Capabilities of context-free grammars, Types of Parsing, Top-down Parsing, Bottom-Up parsing, Operator precedence parsing, Predictive parsers, LR Parser, automatic construction of parser using YACC

Unit V	**Syntax Directed Translation and intermediate code generation**

Syntax directed definitions, Implementation of Syntax directed translators, Intermediatecode, PostfixNotation, Parse trees and syntax trees

Unit VI	**Error detection, recovery and Introduction to Code Optimization**

Errors, Lexical errors, Syntactic errors, Semantic errors, Sources of optimization, Loop optimization

Reference Books:

1. Compilers - Principles, Techniques and Tools -By A.V. Aho, R. Shethi and J.D. Ullman –(Pearson Education)
2. Compiler Construction -By Dhamdere-(Mc-Millan)

Code-BSE 304 B Elective	Third Semester	**Computer Graphics**	Credits:04

Course Objectives:

- The main objective of this module is to introduce to the students the concepts of computer graphics. It starts with an overview of interactive computer graphics, two dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping.

Course Outcomes:

- To list the basic concepts used in computer graphics.
- To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
- To describe the importance of viewing and projections.
- To define the fundamentals of animation, virtual reality and its related technologies.

Unit I	**Introduction to computer graphics**

Introduction, Advantages of CG, Applications of CG, Display Devices, Cathode ray tubes, Color CRT monitors, Direct View Storage Tube

Unit II	**Raster Scan graphics & Transformation**

Line drawing algorithm, Digital Differential Analyzers, Bresenham`s Line algorithms

Unit III	**Transformation**

Two dimensional transformation, Matrix representation, Translation, Rotation, Scaling, Reflection, Shearing

Unit IV	**Segmented Display Files**

Segment table, Functions for segmenting display file, Posting &unposting segments, Segment naming scheme, Default error conditions, Appending to segments

Unit V	**Clipping window & display file Compilation**

2-D clipping, Simple visibility algorithm, End point codes, Midpoint subdivision algorithm, Display File Compiler, Refresh concurrent with reconstruction, Free storage allocation, Display file structure

Unit VI	**Geometrics Model & Graphics package**

Geometric modeling, Symbols & instances, Implementation of Instance transformation, Ground rules for graphics s/w design, Function domains, Graphics primitives

Reference Books:

Sr.No.	Name of the book	Author	Publication
1	Principles of interactive computer graphics	William Newman & Robert Sproull	THM
2	Procedural elements for computer graphics	david f. Rogers	THM
3	Computer graphics	-A.P.Gogse	

Code-BSE 305 A	Third Semester	**Open Elective**	Credits:04
University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses			

OR

Code-BSE 305 B **Elective**	Third Semester	**Numerical Aptitude**	Credits:04

Course Objectives:

- Practicing Basics of mathematics
- Use of Numbers
- Finding Percentage and Profit or Loss, Average
- Finding Time, Speed, Distance,
- Use of permutation and combination and Probability

Course Outcomes:

- Develops problem solving skills of student
- Improves Basic and advanced calculations used in day to day life.
- Improves Mental Alertness
- Analytical Thinking

Unit I	**Introduction of Number system**

A. Numbers: Types of numbers, Divisibility tests of numbers, arithmetic progression, Geometric progression, Relationship between Arithmetic progression and Geometric progression.
B. HCF and LCM : Methods of calculating highest common factor and greatest common divisor, factorization method, Division method, Finding HCF and LCM more than two numbers, LCM factorization method, Division method, Finding HCF and LCM more than two numbers, LCM and HCF of fractions and decimal numbers, Applications of LCM and HCF.

Unit II	

A. Average: Definition of average, Formulae and theoretical problem on average.
B. Problem on ages: simultaneous equations and their applications, Theoretical problems on ages, Theoretical problems on numbers.

Unit III	

A. Percentage: Concept of percentage, Application of percentage, Results on populations, Result on depreciations, Theoretical problem on percentage.
B. Profit and Loss: Definition of cost price, selling price and profit, Formulae of profit and loss, Theoretical problems on profit and loss.

Unit IV	

A .Time and Distance: Concept of time and distance, Formulae of time and distance, Theoretical problems on time and distance.
B. Problems on Train: Formulae of problems on train, Theoretical problems on train
C. Boat and streams: Concept of boat and streams, Formulae of boat and streams, Theoretical problems on boat and streams.

Unit V	

A. Time and Work: Concept of time and work, Relationship between time and work, Theoretical problems on time and work.

B. Allegations and Mixtures: Definition of allegation and mixtures, Rules of allegation's, Theoretical problems on mixture and allegation.

Unit VI

A . Simple and Compound Interest: Definition of simple and Compound interest, Formulae of simple and compound interest, Relationship between simple and compound interest, Theoretical problems on simple and compound interest.

B. Permutations and combinations: Definition of permutations and combinations, Formulae of permutation and combinations, Relationship between permutation and combinations, Problems on permutations and combinations.

C. Probability: Definition of probability, Examples of performing a random experiment, Probability of occurrence of an event, Results on probability, Theoretical problems on probability.

Reference Books:

Sr. no.	Name of the book	Author	Publication
1.	Quantitative Aptitude	Dr.R.S Aggarwal	S.Chand and Company
2.	Quantitative Aptitude	AbijitGuha	Tata McGraw Hill Education
3.	www.indiabix.com		
4.	www.allindiaexams.in		

Code BSE 306	Third Semester	**C++ Programming**	Credits:02

Practical List:

1. Simple C++ program
2. Program on data types
3. Program for looping and branching statement
4. Program for Reference variable
5. Program for function overloading
6. Program for friend function and inline function
7. Program for static data member and function
8. Program for operator overloading
9. Program for Inheritance
10. Program for virtual function
11. Program for File handling
12. Program for Template

Code BSE 307	Third Semester	**VB.Net Programming**	Credits:02

Practical List:

1. Write a console application to demonstrate the use of redim keyword in array.
2. Write a windows application to demonstrate the use of IF—Else statement (Mark memo).
3. Write a windows application to demonstrate the use of looping statements (multiplication table using for loop, sum of digits using while loop, reverse of digits using do while).
4. Write a windows application to demonstrate the use of subroutine.
5. Write a windows application to demonstrate the use of function (swapping using call value & call by reference).
6. Write a windows application to demonstrate the use of list box.
7. Write a windows application to demonstrate the inheritance.
8. Write a windows application to demonstrate polymorphism.
9. Write a windows application to demonstrate the use of properties and methods of char class.
10. Write a windows application to demonstrate the use of properties and methods of string class.
11. Write a windows application to demonstrate the use of properties and methods of datetime class.
12. Write a windows application to demonstrate the use of properties and methods of Directory Info class.
13. Write a windows application to demonstrate the use of properties and methods of File Info class.
14. Write a windows application to demonstrate the use of properties and methods of file stream class.

Code BSE-401	Fourth Semester	**Computer Networks**	Credits:04

Course Objectives:

- Study of Network design, Configuring & Troubleshooting
- To introduce basic concepts and functions of modern network devices.
- To understand various transmission media.
- Study of switching techniques.
- To understand various routing protocol configuration.

Course Outcomes:

- Design, install, configure, troubleshoot and manage components of computer systems.
- Apply basic knowledge of Network Devices.
- Install, manage, and maintain LAN & WAN

Unit I	**Review of Basic Concepts**

What is Network, Benefits of Networking, Data Communication Model, Data communication Task, Network Types- LAN, WAN, Wireless LAN, Client Server Model

Unit II	**LAN Hardware**

Network Interface Card, Transmission Media- Co-Axial, Twisted Pair, Fiber Optic, Network Topology- BUS, RING, STAR.,IP Address, Network Devices- Switch, Repeater, Router, Ethernet Technology

Unit III	**Network Standard & Protocol**

Reference Model- OSI, TCP/IP Reference Model, Protocols- FTP, SMTP, HTTP, Concepts of DNS, Internet v/s Intranet, E-mail, Search Engine

Unit IV	**Internet layer**

IP Datagram, ICMP Protocol, DHCP Protocol, Routing Protocols-Interior or Exterior, Routing information protocol (RIP), Open Shortest Path First Protocol (OSPF) , EIGRP Protocol Configuration.

Unit V	**Transport Layer**

Transport layer services, connection oriented & connection less service, Elements of Transport layer, Socket, UDP Protocol

Unit VI	**Virtual LAN & Security**

Virtual LAN, IEEE8021.q & ISL Protocol, VLAN Configuration, VTP Protocol, Firewall, Proxy Server, VPN

Reference Books:

Andrew S. Tannenbaum,"Computer Networks", (Third Edition), Prentice-Hall of India Pvt. Ltd, New Delhi

Todd Lamle "CCNA" 640-802

Code BSE-402	Fourth Semester	**Introduction to Core Java**	Credits:04

Course Objectives:

- It is general purpose and Object oriented programming language. In which we are able to developed general purposed applications software and programming languages.
- Programming Language are also used to build students logic for programming.

Course Outcomes:

- To study the object oriented approach.
- To study basic need and its features.
- To develop programs using operators and control statement.
- To describe an array.
- Student are able to develop application software.

Unit I	**Introduction**

Java Milestone, Java Features, How Java Differ from C and C++, Java Environment and Tools, Installing and Configuring Java.

Unit II	**Overview of Java Language**

Introduction, Types of Comment, Java Tokens (Reserve Keywords , Identifiers, Literals, Operators, Data Types), Array, Control Statement - Branching statement - Looping statement, Java Programming Structure.

Unit III	**Classes, Objects and Methods**

Introduction, Defining Class (Fields Declaration, Methods Declaration, Creating Objects, Visibility Control), Use of 'this' Keyword, Method Parameters, Method Overloading, Constructor and Constructor Overloading, Static Members, Finalizer Method.

Unit IV	**Inheritance and Interface**

Inheritance and It's Types, Method Overriding, Final Variable, Method and Final Class, Abstract Method and Abstract Class, Defining and implementing interface, String Classes, StringBuffer Class.

Unit V	**Package and Exception Handling**

Package - Create Package - Accessing Package, Exception - Types of Error - Multiple catch statement - Creating User defined Exception - Finally clause

Unit VI	**Applet Programming**

Introduction, Creating Applets, Applet Life Cycle, Applet Tag, Passing Parameters to Applets .

Reference Books:

Sr. No	Name of Book	Writer	Publication
01	Complete Reference	Herbert Schildt	Tata McGraw-Hill

				publishing company Ltd.	
	02	Java 2 programming black books	Steven Horlzner	DreamTech press	
	03	Core Java Volume-IFundamentals Eighth Edition	Cay S. Horstmann, Gary Cornell, Prentice Hall	Sun Microsystems Press	
	04	Programming with Java	E Balagurusamy	The McGraw Hill Education Pvt. Ltd. New Delhi	

Code BSE-403	Fourth Semester	**Internet Technology using PHP**	Credits:04

Course Objectives:

- To get familiar with basics of the Internet Programming.
- To acquire knowledge and skills for creation of web site considering both client and server side programming

Course Outcomes:

- Build Dynamic web site using server side PHP Programming and Database connectivity.
- Describe and differentiate different Web Extensions and Web Services.

Unit I	**Introduction to PHP**

Basic Syntax, Lexical Structure of PHP, Sending Data to the Web Browser, Understanding PHP, HTML, and White Space, Writing Comments, What Are Variables? About Strings, About Numbers, About Constants

Unit II	**Programming with PHP**

Creating an HTML Form, Handling an HTML Form, Managing Magic Quotes, Conditionals and Operators, Validating Form Data, What Are Arrays? For and While Loops

Unit III	**String Manipulation and Regular Expression**

Creating and accessing String, Searching &Replacing String, Formatting, joining and splitting String, String Related Library functions, Use and advantage of regular expression over inbuilt function, Friend Function

Unit IV	**Creating Dynamic Web Sites**

Including Multiple Files, Handling HTML Forms with PHP Redux, Making Sticky Forms, Creating and Calling Your Own Functions, Variable Scope, Date and Time Functions, Sending Email

Unit V	**Using PHP with MySQL**

Connecting to MySQL and Selecting the Database, Executing Simple Queries, Retrieving Query Results Ensuring Secure SQL, Counting Returned Records, Updating Records with PHP

Unit VI	**Cookies and Sessions**

Using Cookies, Using Sessions, Sessions and Cookies, Improving Session Security

Reference Books:

Sr.No.	Name of the Book	Author	Publication
1.	PHP and MySQL for DynamicWeb Sites: Visual Quickpro Guide, Second Edition	Larry Ullman	BPB Publication
2.	Programming PHP	RasmusLerdorf, Kevin Tatroe, Peter MacIntyre	BPB Publication

Code BSE-404 A Elective	Fourth Semester	**Introduction to Multimedia**	Credits:04

Course Objectives:

- This course aims to introduce the fundamental elements of multimedia. It will provide an understanding of the fundamental elements in multimedia. The emphasis will be on learning the representations, perceptions and applications of multimedia.

Course Outcomes:

- On completion of the course, students should be able to I
  - Explain basic principles of multimedia;
  - Develop and design multimedia products;
  - Apply text, graphics, animations, videos and sounds in multimedia products;
  - Explain the use of computer hardware and software in relation to multimedia production

Unit I	**Introduction**

Definition of Multimedia elements, Multimedia Elements, Multimedia Applications, Global structure of Multimedia

Unit II	**Data Compression**

Storage space, Coding requirements, Basic compression techniques (Run length& Huffman encoding, Introduction to following compression techniques: JPEG, MPEG

Unit III	**Optical Storage Media &Retrieval Technologies**

Basic Technology, Video Disk & other WORMS, CD-ROM and Multimedia Highway, DVD- ROM

Unit IV	**Sound / Audio**

Basic Concept of Sound, MIDI, Digital audio, Audio file formats

Unit V	**Image And Graphics**

Making Still Images : BITMAPS , Vector Drawing, Colors, Image Formats, Graphics Formats, Image File Formats: BMP, JPEG, TIFF, PNG.

Unit VI	**Video& Animation**

Basic concepts (Using Video), Broadcast Video Standards, Television (Conventional systems, Enhanced definition systems, High Definition system), Computer based Animation

Reference Books:

Sr. No.	**Name of the Book**	**Author**	**Publication**
1	Multimedia System Design	By P. K. ANDLEIGH, KIRAN THAKRAR	DhanpatRai Publications
1	Multimedia : Computing Communications & Applications	By Ralf Steinmetz And Klara Nehrstedt	Pearson Education

Code BSE-404 B Elective	Fourth Semester	**Distributed Computing**	Credits:04

Course Objectives:

- Introduce distributed computing environment.
- Emphasize on design techniques and constraints of distributed computing environment.
- Emphasize on analysis of distributed computing environment.

Course Outcomes:

- Distinguish between distributed computing and parallel computing.
- Understand concepts of architectural Styles, Communication, and Synchronization.
- Demonstrate different naming & synchronization technologies
- Explore various distributed concepts.

Unit I	**Introduction**

Definition of distributed system, Goals, Types of Distributed systems

Unit II	**Architectures**

Architectural styles, System Architectures: Centralized Architectures, Decentralized Architectures, Hybrid Architectures, Architectures Versus Middleware, Interceptors, General Approaches to Adaptive Software, Self-Management in Distributed systems, The Feedback Control Model, Example: Systems Monitoring with Astrolabe

Unit III	**Processes**

Threads, Virtualization, Clients, Servers, Code Migration

Unit IV	**Communication**

Fundamentals, Remote Procedure Call, Basic RPC Operation, Parameter Passing, Asynchronous RPC, Message oriented communication,Message Oriented Transient, Communication (Berkely Sockets), Message Oriented Persistent, Communication (Message Queuing Model), Stream oriented communication, Multicast communication

Unit V	**Naming**

Names, Identifiers, and Addresses, Flat Naming, Simple Solutions, Broadcasting & Multicasting, Forwarding Pointers, Structured Naming, Attribute-Based Naming

Unit VI	**Synchronization**

Clock synchronization: Physical clocks, Global Positioning System, Clock synchronization Algorithms, Logical Clocks, Lamport‟s Logical Clock, Vector Clocks, Mutual Exclusion: Centralized Algorithm, A Decentralized Algorithm, A Distributed Algorithm, A Token Ring Algorithm,Election Algorithms, Traditional Election Algorithms (Bully, Ring Algorithm), Election in Wireless Environments

Reference Books:

1. Distributed Systems Principles and Paradigms, Second Edition- by Andrew S. Tanenbaum, Maarten Van Steen. PHI ISBN-978-81-3498-4

Code-BSE 405 A	Fourth Semester	**Open Elective**	Credits:04
University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses			

OR

Code-BSE 405 B **Elective**	Third Semester	**Logical Reasoning**	Credits:04

Course Objectives:

- This course enables students to develop their ability to reason by introducing them to elements of reasoning
- Basics knowledge of different types of Series
- Study of Coding and Decoding
- Knowledge of Blood Relations, Directions and Puzles

Course Outcomes:

- Develops ability to think logically of student
- Understanding Relations, Directions, Arrangements, Logics, Puzzles.
- Improves Mental Alertness
- Construct a logically sound and well-reasoned argument.

Unit I	**Series, Analogy and Classification Lectures series, Examples on continues pattern series.**

A.Series: Types of series, Alphabet series, Alpha numeric
B. Analogy: Completing the Analogous Pair, Direct/Simple Analogy, Choosing the Analogous Pair, Double Analogy, Number analogy, Alphabet analogy, Correlation between letters/numbers.
C .Classification: Choosing the odd word, Choosing the odd numeral, Choosing the odd letter group

Unit II	**Coding-Decoding Lecturers**

A. Coding-Decoding: Letter coding, Direct Letter Coding, Number/Symbol Coding.
B .Substitution: Concept of substitution, Problem solving by using substitution
C. Deciphering: Deciphering messages word codes, Deciphering numbers/symbol codes for messages.

Unit III	**Blood Relation Lectures**

A. Introduction to relations
B. Concepts of deciphering relations based problems
C.Problems on deciphering jumbled up descriptions
D. Relation puzzle
E. Coded relations.

Unit IV	**Seating or Placing Arrangement Lectures**

A. Problems based on linear and circular based arrangement

Unit V	**Direction Sense Test Lectures**

A. Introduction
B. Problems based on angular changes in direction
C. Problems on Shadows
D. General Problems based on Pythagoras Theorem

Unit VI	**Syllogism and Data Sufficiency Lectures**

A.Syllogism: Introduction of logic, Rules of syllogism, Two statement problem, Three statement problem
B. Data Sufficiency: Problems of Data sufficiency based on all Chapters.

Reference Books:

Sr. no.	Name of the book	Author	Publication
1.	A Modern Approach to Verbal & NonVerbal Reasoning	Dr.R.S Aggarwal	S.ChandandCompany
2.	Test of Reasoning	Edgar Thorpe	McGraw Hill Education
3.	www.practiceaptitudetests.com		
4.	www.allindiaexams.in		

Code BSE 406	Fourth Semester	**Java Programming**	Credits:02

Practical List:

1. Program to demonstrate Constant Variable.
2. Program to demonstrate scope of Variable
3. Program to demonstrate branching statement
4. Program to demonstrate Looping statement
5. Program to demonstrate simple class
6. Program to demonstrate method parameter
7. Program to demonstrate method overloading
8. Program to demonstrate constructor
9. Program to demonstrate static member
10. Program to demonstrate Method overriding
11. Program to demonstrate Final variable, Method and Final Class.
12. Program to demonstrate Finalize method()
13. Program to demonstrate Array and It's types.
14. Program to demonstrate String class and it's method.
15. Program to demonstrate String Buffer and it's method.
16. Program to demonstrate inheritance and its Types
17. Program to demonstrate Abstract method and Abstract Class.
18. Program to demonstrate Multiple catch statement
19. Program to demonstrate finally clause
20. Program to demonstrate package
21. Program to demonstrate interface
22. Program to demonstrate Applet life cycle
23. Program to demonstrate param tag

Code BSE 407	Fourth Semester	**PHP Programming**	Credits:02

Practical List:

1. Creating HTML FORM
2. Validating Form Data
3. Date and Time Functions
4. Sending Email.
5. Program based on arrays.
6. Program based on loops.
7. Making Sticky Forms
8. Creating and Calling Your Own Functions
9. Including multiple files.
10. Using the MySQL Client
11. Creating Databases and Tables
12. Connecting to MySQL and Selecting the Database, Executing Simple Queries, Retrieving Query Results , Ensuring Secure SQL , Counting Returned Records , Updating Records with PHP 13. Using Cookies
13. Using Sessions.