।। 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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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. Optional Information technology
(Revised CBCS pattern)

Introduced from Academic Year 2020-21

B.Sc. Optional Information Technology

B.Sc. Optional Information Technology (3years) program / degree is a general B.Sc. program where students opt Computer Application as one of the optional subject. It builds the student on studies in Computer Application 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. Optional Information Technology 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. Optional Information Technology** 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.

The credit pattern is similar to other optional subjects like Physics, Mathematics, Chemistry, etc.

The Grading pattern to evaluate the performance of a student is as per the University rules.

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The detailed syllabus structure is as belwo,

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Science & Technology

Under Graduate (UG) Program

Curriculum of B. Sc. B.Sc. Optional Information Technology

(W. E. F. Academic Year 2020-2021)

Year/ Sem	Code	Paper	Title of Paper	Periods /Week	Credit	Exam Hrs.	Marks		
							Ext.	Int.	Tot.
Sem-III	OIT-201	VI	Introduction to Data Structure	03	02	02	40	10	50
	OIT-202	VII	C++ Programming	03	02	02	40	10	50
	OIT-204	SEC-I	Skill Enhancement Course-I: A) Programming using SCILAB OR B) PC Installation & Networking	03	02	02	25	25	50
Sem-IV	OIT-205	VIII	Operating System Concepts	03	02	02	40	10	50
	OIT-206	IX	Java Programming	03	02	02	40	10	50
	OIT-208	SEC-II	Skill Enhancement Course-II: A) Introduction to Web Applications OR B) Digital Media Concepts	03	02	02	25	25	50
Annual Practicals	OIT-203	X	Practical's based on theory papers-VI & VII (DS and C++)	04	02	03	40	10	50
	OIT-207	XI	Practical's based on theory papers-VIII & IX (OS and Java)	04	02	03	40	10	50
Total				26	16		290	110	400

Note: A Practical group/ batch for practical papers are recommended to have 10-15 students as per the SRTMUN and UGC Guidelines under CBCS (Choice Base Credit System).

Theory: Paper No.VI
Introduction to Data Structure

Course Code: OIT-201 **[Marks: 50 Total Periods: 45]**

Course Objectives:

1. To solve problems using **data structures** such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.
2. Able to write well-structured procedure-oriented programs

Course Outcome:

1. To develop application using data structures.
2. Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching etc.

Unit-I **Periods:10**

Definition of Data Structure, Elementary data organization, data structure operations, Algorithmic notations, Control structure.

Unit–II **Periods:10**

Introduction to Linked list, Representation of linked list in memory, Traversing, Searching in Unsorted linked list, Overflow and Underflow, Inserting at the beginning of a list, deleting node following a given Node.

Unit –III **Periods:10**

Stack: Introduction, Memory representation of Stack, Insert element in Stack i.e. PUSH operation, Delete element from Stack i.e. POP operation.
Queue: Introduction, Memory Representation, Insert & Delete operation in Queue.

Unit-IV **Periods:15**

Tree: Introduction, Definition of a Binary tree & its Memory representation, Traversing a Binary Tree, PREORDER, INORDER, POSTORDER Traversal, Threaded binary tree.
Graph: Introduction, Memory Representation of graphs,

References Books:

1. Data Structure by Seymour Lipschtz (TMH Publication)

2. An Introduction to Data Structure with Application by Jean Paul

3. Introduction to Algorithms, Cormen Chatles E. Leiserson, PHI Edition

Theory: Paper No. VII
C++ Programming

Course Code: OIT-202 **[Marks: 50 Total Periods: 45]**

Course Objectives:

1. To understand how C++ improves C
2. To learn OOPS concepts
3. To learn how to design C++ classes for code reuse.

Course Outcome:

Upon compilation of this course, students will able to do programming independently and will also be able to built small applications.

Unit I: **Periods: 10**

Basic Concepts of OOP, Object Oriented Languages, Applications of OOP, Structure of C++ program. Difference between Top down & bottom up language.

Unit II: **Periods: 15**

Introduction to Tokens, Keywords, Identifiers & Constants, Basic Data Types, Variables Operators in C++, Decision Control & Loop Control Structures: If, If-else, Nested If, Else-if ladder, switch, goto Statement, break statement, while, do-while, for loop.

Unit III: **Periods: 10**

Introduction to Function, Function Prototyping, Call by Value & Call by reference, inline function, default arguments, Function Overloading, Library Functions

Unit IV: **Periods: 10**

Introduction Structures, specifying a Class, Defining member functions, Static Data Members, Static Member Functions, Friend Functions. Introduction to Constructors, destructors. Introduction to Inheritance.

Text/Reference Books:

1. Object-Oriented Programming with C++ -E-Balgurusamy
2. The C++ Complete Reference -TMH Publication
3. Object Oriented Programming in C++ by Robert Lafore

Paper No. SEC-I
Skill Enhancement Course-I:

A) PROGRAMMING USING SCILAB

OR

B) NETWORKING CONCEPTS

Course Code: OIT-204 **[Marks: 50]**

Course Objectives:
To learn basic functioning in SCILAB.

Course Outcome:
Students will be able to understand the main features of the SCILAB program development environment, to implement simple mathematical functions/equations in numerical computing environment such as SCILAB.

Skill Enhancement Course-I: 204 (A) PROGRAMMING USING SCILAB

Unit I:
Why Scilab, Capabilities of Scilab package, benefits of shifting to scilab

Unit II:
Installing and tuning

Unit III
Getting Started, Expressions: Show mathematical expressions with numbers, Variables, Diary command, Define symbolic constants, Basic functions, suppressing output (;), help, etc.

Unit IV:
Vector Operations, Define vector, Calculate length of a vector, Perform mathematical operations on Vectors such as addition, subtraction and multiplication, Define a matrix, Calculate size of a matrix, Perform mathematical operations on Matrices such as addition, subtraction and multiplication

Text/References Books:
1. Engineering & Scientific Computing with MATLAB by C. Gomez
2. SCILAB by A.S. Nair Online References:
3. www.spoken-tutorial.org

OR

Skill Enhancement Course-I:

204 (B) PC Installation & Networking

Course Objectives:

The course is designed to build practical skills in Assembling & maintenance of the personal desktop computer, installation of operating system and software's as well as to setup the network.

Course Outcome:

Students would have knowledge of computer hardware and peripherals , their installation, PC assembly, trouble shooting.

Unit I:

Study of computer devices: Keyboard, Mouse, Monitor, RAM, Hard Disk, CD Drive, Motherboard, SMPS, Pen Drive

Unit II:

Installation of Windows OS on a Computer, Using System Tools: disk clean up, disk defragmentation, Antivirus Software

Unit III:

Windows OS Administration: Creating User, Installing/Uninstalling programs, copy files & folders, Creating a CD, Formatting Pen Drives,

Unit IV:

Installing printer, Connecting to LAN, Using Printer in LAN, Sharing Files on LAN Connecting to Internet, Browsing web sites, creating an E-mail account, Downloading contents from Internet

Text/References Books:

1. Computer Installation & Servicing by D Balsubrmaniyam, McGraw Hill Pub.
2. PC : Repair & Maintenance a practical guide by J Rosenthal, K Irwin
3. Easy PC Maintainance & Repair by Philip Laplante, McGraw Hill Pub.

Theory: Paper No.VIII
Operating System Concepts

Course Code: OIT-205 **[Marks: 50 Total Periods: 45]**

Course Objectives:

1. To learn fundamentals of Operating System,
2. To understand the structure and organization of the file system,
3. To learn mechanism of OS.

Course Outcome:

Students will be able to the basic components of a computer Operating System.

Unit I: **Periods: 15**

Introduction to Operating System, Computer-System Architecture, Operating-System Structure, Operating System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems.

Unit II: **Periods: 10**

Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Virtual Machines, Operating-System Generation, System Boot

Unit III: **Periods: 10**

Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication, Examples of IPC Systems, Communication in Client- Server Systems, Overview of threads, Multithreading Models

Unit IV: **Periods: 10**

Memory Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, virtual memory, File Concept, File-System Mounting, File-System Structure

Text/Reference Books:

1. A SILBERSCHATZ, et.al. “Operating System Concepts”, John Wiley & Sons.
2. A Tanenbaum “Modern Operating Systems”, PHI Publication
3. William Stallings “Operating Systems”, Prentice Hall

Theory: Paper No. IX
Java Programming

Course Code: OIT-206 **[Marks: 50 Total Periods: 45]**

Course Objectives:

1. To learn why Java is useful for the design of desktop and web applications.
2. To learn how to implement object-oriented designs with Java.
3. To identify Java language components and how they work together in applications.

Course Outcome:

On completion of the course the student would be able to use Java integrated development environment to write, compile, run, and test simple object-oriented Java programs. Further, they would be able to make elementary modifications to Java programs that solve real-world problems.

Unit I: **Periods: 10**

Java Features, how java differs From C and C++, Java and Internet, Java & www, Web Browsers, Java support systems, JVM, Java program structure,

Unit II: **Periods: 10**

Java Tokens, Constants, Variables, Data Types, Declaration of variable, Giving Values to variables, Scope of Variables, Symbolic Constants, Command Line Arguments, Java Statements, simple java program,

Unit III: **Periods: 15**

Introduction & defining a class, adding variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors. Method Overloading, Static Members, Inheritance: Extending a class, Overriding Method, Final variable and Methods.

Unit IV: **Periods: 10**

Introduction, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variables, Introduction to Arrays. Introduction to Java API package.

Text/Reference Books:

1. Programming with Java - A primer-By E. Balagurusamy (Tata Me Graw Hill)
2. Java 2 Complete Reference
3. Java How to program by Deitel

Paper No. SEC-II
Skill Enhancement Course-II:

(A) Introduction to Web Applications
OR
(B) Digital Media Concepts

Course Code: OIT-208 **[Marks: 50]**

Skill Enhancement Course-II: 208 (A) Introduction to Web Applications

Course Objectives:
The course is designed to build practical skills of development of web applications. Learn how to setup a quick and easy website with the new free Google sites.

Course Outcome:
Knowledge of website development and design specialization

Unit I
What is Web? Internet, what is mean by web site?

Unit II
Create a site, change your Sites Appearance, change your Site's Layout, create a Page, Create and Edit Page Templates, Track visitors to your site, Report abuse and illegal activity.

Unit III
Add text, images, or links, create custom page layouts or gadgets, add a Google Group on your website, use scripts to do tasks on your site,

Unit IV
Attach files from your computer, Link to files or text within your site, insert calendars, maps, Google Drive files and gadgets, share your site with other people, Change your site's homepage and search, Comment on a page.

Text/Reference Books:
Google sites & Chrome for Dummies by R Teeter & K Barksdale,

OR

Skill Enhancement Course-II:
(B) Digital Media Concepts

Skill Enhancement Course-II: OIT-208 (B) Digital Media

Course Objective:
The course is designed to build practical skills in the creation and publication of digital technologies.

Course Outcome:
Student will be able to use essential skills for digital media

Unit I:
Presentation Software, Introduction to power point, Creating Presentation with power point, Introduction to Flash, Creating Presentation with flash

Unit II:
Blogging, Fundaments of blog, Common examples of Blog, Create a blog with multimedia content

Unit III:
Digital photography, Basics of Digital Photography, Camera and shooting, Digital image editing, Digital image management

Unit IV:
Podcast, Fundaments of Podcast, Audio recording and editing, Publishing and hosting podcast, Social Media tools, Writing content for the web, Search engine optimisation.

Text/References Books:
1. Digital Photography for dummies by Julie A King
2. Learning to use Powerpoint by A Bassant
3. Podcasting by Steve Shipside

Practical: Paper No. X
Practical's based on theory papers-VI & VII (DS and C++)

Course Code: OIT-203 **[Marks: 50]**

Course Objectives:
The objective of this course is to expose the students to the fundamentals & basic concepts in data structure issues as well as object-oriented features of c++.

Course Outcome:
Upon successful completion of this course, students should be able to implement data structures and their fundamental operations like searching and sorting. They will also be able to design and develop programs in c++.

Practical's based on theory papers-VI & VII (DS and C++)

At least 20 (10 from each paper) practical exercises related with theoretical units

Practical: Paper No. XI
Practical's based on theory papers- VIII & IX (OS and Java)

Course Code: OIT-207 **[Marks: 50]**

Course Objectives:
To develop an understanding of computer operating system like Linux. Further, to understand how Java is better than C++.

Course Outcome:
Expertise in some specific areas of operating system such as the installation and maintenance. Knowledge and implementation of objects and classes in Java .

Practical's based on theory papers-VI & VII (OS and Java).

At least 20 (10 from each paper) practical exercises related with theoretical units.