|| सा विद्या या विमुक्तये ||

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड
"ज्ञानतीर्थ" परिसर, विष्णुपुरी, 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

25
1994 - 2019
SILVER JUBILEE YEAR

ACADEMIC (1-BOARD OF STUDIES) SECTION

संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे **CBCS Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, **दिनांक ०८ जून २०१९ रोजी संपन्न झालेल्या ४४व्या मा. विद्या परिषद बैठकीतील ऐनवेळचा विषय क्र.११/४४–२०१९** च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्यात येत आहेत.

1.	Agricultural Microbiology	18.	Dyes and Drugs
2.	Agrochemicals & Fertilizers	19.	Electronics
3.	Analytical Chemistry	20.	Environmental Science
4.	B.C.A.	21.	Fishery Science
5.	B.Voc. (Food Processing, Preservation and Storage)	22.	Food Science
6.	B.Voc. (Web Printing Technology)	23.	Geology
7.	Biochemistry	24.	Horticulture
8.	Bioinformatics	25.	Industrial Chemistry
9.	Biophysics	26.	Information Technology (Optional)
10.	Biotechnology (Vocational)	27.	Mathematics
11.	Biotechonology	28.	Microbiology
12.	Botany	29.	Network Technology
13.	Chemistry	30.	Physics
14.	Computer Application (Optional)	31.	Software Engineering
15.	Computer Science (Optional)	32.	Statistics
16.	Computer Science	33.	Zoology
17.	Dairy Science		

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–०१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/
२०१९–२०/२९२
दिनांक : ०३.०७.२०१९.

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)
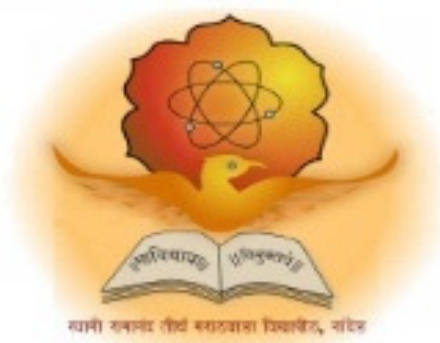
Syllabus of

B.Sc. Optional Computer Science (3 years) (Revised CBCS pattern)

Introduced from Academic Year 2019-20

B.Sc. Optional Computer Science

B.Sc. Optional Computer Science (3years) program / degree is a general B.Sc. program where students opt computer science as one of the optional subject. It builds the student on studies in computer science tools and techniques and to become competent in the current race in computer science and development. The duration of the study is of six semesters, which is normally completed in three years.

CBCS pattern

The B.Sc. Optional Computer Science 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 Computer Science** 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

COMPUTER SCIENCE (OPTIONAL)

CURRICULUM

(W. E. F. Academic Year 2019-2020)

CLASS: B. Sc. COMPUTER SCIENCE (Optional)

Year/ Sem	Code	Paper	Title of Paper	Periods /Week	Credit	Exam Hrs.	Ext	Int	Tot
Sem-I	OCS-101	I	Programming Logic Concepts	03	02	02	40	10	50
	OCS-102	II	Designing of Web Pages Using HTML	03	02	02	40	10	50
Sem-II	OCS-103	III	Introduction to Data Structure	03	02	02	40	10	50
	OCS-104	IV	Programming in C Language	03	02	02	40	10	50
Annual	OCS-105 (Lab)	V	Practical Based on Theory Papers II and IV.	03	04	03	80	20	100

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

Course Code: OCS-101   **[Marks: 50 Total Periods: 45]**

Course Objectives:

1. To develop understanding of problem solving using computers

2. To develop understanding of basic data structures such as arrays

Course Outcome:

1. Student will be able to design algorithms to solve different problems

2. Student will understand how to solve problems using computers

Unit-I: **Periods: 15**
Introduction, Generation of Computer, Classification of Computers, Hardware, Software, Applications of Computers, Computer Architecture: Central Processing Unit: Arithmetic Unit, Logic Unit, Control Unit, Main Memory Unit, Types of Memory, Input & Output Devices:

Unit–II   **Periods: 10**
Introduction to Number systems, the problem solving aspects, top-down design, introduction to Algorithms, implementation of algorithms, the efficiency of algorithms, the analysis of algorithms, Flowchart and it's symbols.

Unit –III   **Periods: 10**
Exchanging the value of two variables, Counting, Summation of set of numbers, Factorial computation, Generation of the Fibonacci sequence, reverses the Digits of an Integer.

Unit-IV   **Periods: 10**
The Smallest divisors of an integer, Generating prime numbers, Definition and Memory Representation of Array, Array order reversal, Array Counting , Finding the Maximum number in a set, sorting by exchange, Binary Search.

References Books:

1. Fundamental of Computers, E. Balagurusamy, Mc.Graw Hill Education.

2. How to Solve by it Computer, R.G.Dromey, Pearson.

3. Data Structure by Seymour Lipschtz, TMH Publication

Course Code: OCS-102   **[Marks: 50 Total Periods: 45]**

Course Objectives:

1. Develop skills in analyzing the usability of a web site.

2. Understand how to plan and conduct user research related to web usability.

3. Learn techniques of responsive web design, including media

Course Outcome:

1. Be able to *use* the HTML programming language

2. Understand the principles of creating an effective web page.

Unit-I   **Periods: 10**

Internet, The Important of the Internet, World Wide Web, URLs, Web Brewers, Web Server, Internet Services, The web flow, objectives of the website, basic interface design, developing a store board for the website, navigation and links within the site, checklist for designing.

Unit–II   **Periods: 10**

HTML, Basic elements, Lists, Linking HTML pages, Linking to URLs, Text formatting, Text Alignment, Character Styles, Fonts and Font Sizes, Using Colors for the Web, Preformatted text, Horizontal lines, Line break, displaying special characters.

Unit –III   **Periods: 10**

Images in HTML Pages, Tables in HTML, Frames, Creating Frames, frame attribute linking, complex framesets, Inline frames, Image maps

Unit-IV   **Periods: 15**

Form designing, Additional Layout features, Intro to CGI Scripting, Active Server Pages, Introduction to Embedding Multimedia and Java Applets, Inserting sound/Audio into Web Pages, Video file formats, Creating Marquee. Into. to JavaScript and Dynamic HTML, Structure of JavaScript.

References Books:

1. Web Publication by Mnica D'Souza, Jude D'Souza, TMH Publication.

2. The Complete Reference HTML & CSS by T.A.Powell , TMH Publication.

3. HTML, DHTML, JavaScript, Perl CGI by IVAN Bayroos, BPB Publication.

<div align="center">

Theory: Paper No.III
Introduction to Data Structure

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Course Code: OCS-103   **[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. IV
Programming in C Language

Course Code: OCS-104   **[Marks: 50 Total Periods: 45]**

Course Objectives:

1. The course aims to provide exposure to problem-solving through programming.
2. It aims to train the student to the basic concepts of the *C*-programming language.

Course Outcome:

1. Course is designed to provide complete knowledge of *C* language to develop logics which will help them to create programs, applications in C.
2. Introduces the more advanced features of the *C* language.

Unit-I   **Periods:12**

Introduction to C, Character set, C tokens, Constant and Variables, Data types, declaration of variables, assigning values to variables, Input /Output Statement, all Operators and Structure of C program.

Unit – II   **Periods:10**

If Statement, If-Else statement, Nesting of If-Else statement, switch Statement, goto, Looping statements, while loop, do-While, for loop, nested loop.

Unit – III   **Periods: 10**

Introduction to Array, types of array declaration and initialization, introduction to function, recursion, standard library string handling functions: strlen(), strcpy(), strcmp(), strcat()., Storage Classes: auto, static, register, extern

Unit – IV   **Periods:13**

Introduction to Function, Introduction to Structure and Union, Defining Structure and Accessing Structure members, Introduction to Concept of File Handling.

Reference Books:

1. Programming in ANSI C by E. Balaguruswami. 5th edition

2. Let Us C – Yashwant Kanetkar

3. C Programming - Kernighen Ritche

[Marks: 100]

Practical Based On Theory Papers – II & IV

Course Code: OCS-105(Lab)

Course Objectives:

1. To familiarize the students to the practical HTML, DHTML and JavaScript
2. Give hands on training to the students and make them acquainted with various Real Time Applications implemented currently in the Industry Using Programming in C Language.

Course Outcome:

1. Practical approach to understand the principles of creating an effective web page.
2. The course is designed to provide complete knowledge of C language to develop logics which will help them to create programs,

➤ **At least 10 Practical Sessions based on Paper No. II.**

➤ **At least 10 Practical Sessions based on Paper No. IV.**