Agricultural Microbiology 18. Dyes and Drugs
3. Analytical Chemistry 20. Environmental Science
5. B.Voc. (Food Processing, Preservation and Storage) 22. Food Science
10. Biotechnology (Vocational) 27. Mathematics
13. Chemistry 30. Physics
15. Computer Science (Optional) 32. Statistics
17. Dairy Science

A C A D E M I C  ( 1 - B O A R D  O F  S T U D I E S )  S E C T I O N

Phone: (02462) 229542  Website: www.srtmun.ac.in  E-mail: bos.srtmun@gmail.com
Fax: (02462) 229574

| या परिप्रेक्ष्यावर सर्व संबंधितांची कल्पनापासून घेते को, दिनांकन ०८ जून २०१९ रोजी संपन्न |
| झल्लेल्या ४४व्या मासात विद्या परिषद बैठकीतिल्या ऐनवेल्डा विषय क्र० ११/४४-२०१९ नवा उद्यानपुरक स्नेही |
| विद्यापीठाच्या संलग्नति महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याश्रेणीतील पदवी स्वायत्तीर्षी प्रमाणे वर्णाने |
| CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९-२० |
| दरमिल माल्य कल्पना येथे आहे. |

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

लक्षात रांगलू क्रमांक:

1. म. कृतिस्रावी याचे कार्यालय, प्रस्तुत विद्यापीठ.
2. म. संवादाचे, पत्ता व मुख्यालय मंडळ याचे कार्यालय, प्रस्तुत विद्यापीठ.
3. प्रामाण्य, सर्व संबंधित संलग्नति महाविद्यालय, प्रस्तुत विद्यापीठ.
4. साहाय्यक कृतिस्रावी, पत्ता विभाग, प्रस्तुत विद्यापीठ.
5. उपकल्पसिद्ध, पत्ता विभाग, प्रस्तुत विद्यापीठ.
6. सिस्टम एस्प्रेस, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
Swami Ramanand Teerth Marathwada University, Nanded
(NAAC Re-accredited with ‘A’ Grade)

Syllabus of
B.Sc. Optional Computer Application
(3 years)
(Revised CBCS pattern)

Introduced from Academic Year 2019-20
B.Sc. Optional Computer Application

**B.Sc. Optional Computer Application** (3 years) 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 Computer Application** 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 Application** 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, NANGED

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMMETER PATTERN

Faculty of Science & Technology

Under Graduate (UG) Programmes

COMPUTER APPLICATION (OPTIONAL)

CURRRCULUM

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

CLASS: B. Sc. COMPUTER APPLIACION (Optional)

<table>
<thead>
<tr>
<th>Year/ Sem</th>
<th>Code</th>
<th>Paper</th>
<th>Title of Paper</th>
<th>Periods /Week</th>
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<td>Sem-I</td>
<td>OCA-101</td>
<td>I</td>
<td>Problem solving with Computers</td>
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<td>Web Page Designing using HTML</td>
<td>03</td>
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<td>OCA-103</td>
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<td>Programming With C</td>
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<td>OCA-104</td>
<td>IV</td>
<td>Introduction to Data Structures</td>
<td>03</td>
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<td>Annual</td>
<td>OCA-105</td>
<td>V</td>
<td>Practical Based on Theory Papers II and III</td>
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**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)
Theory: Paper No–I

Problem solving with Computers

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

Course Objectives:

1. This course aims to introduce the classic algorithms in various domains,
2. Apply algorithms and design techniques to solve problems
3. Ability to analyze the performance of algorithms

Course Outcome:

1. Ability to choose appropriate algorithm design techniques for solving problems.
2. To design the algorithms to solve the programming problems.

Unit 1: Fundamentals of Computer (08 Periods)
Introduction to Computers, Block diagram of Computer, Characteristics of Computers, I/O Devices, I/O ports.

Unit 2: Problem Solving Aspects (08 Periods)

Unit 3: Fundamentals of Algorithms (08 Periods)
Exchanging value of variables, counting numbers, Summation of set of numbers, Factorial computations, Fibonacci number, Reverse of Digits.

Unit 4: Factoring Methods (05 Periods)
Finding square root of numbers, smallest divisor of integers, greatest common divisor, Generation of prime numbers, prime factor.

Unit 5: Array Techniques (08 Periods)
Introduction to Array, types of Array, Memory Representation of Array, Reverse of Array, Array counting, Finding maximum and minimum element from Array

Unit 6: Searching & Sorting Techniques (08 Periods)
Searching Techniques, linear search, binary search, Sorting Techniques:- bubble sort, selection sort.
Text book:

1. How to Solve it by Computer, Dromy R.J
2. Data Structure by Lipschutz Shaum Series

Reference Book:

1. Computer Fundamental by Anita Goel
2. Fundamentals of Computer by Dr. Bichkar & Dr. Sontakke
Course Code: OCA-102  [Marks: 50 Total Periods: 45]

Course Objectives:

1. Develop skills in analyzing the usability of a web site.
2. HTML and CSS. Learn techniques of responsive web design
3. Basic knowledge in HTML tags & skill of creating web pages

Course Outcome:

1. Be able to use the HTML programming language. Resolves written HTML codes.
2. Be able to use the Design Programs.

(Marks: 50 Periods: 45)

Unit 1: Introduction to Web and Website  (08 periods)
Introduction to Internet, Application and importance of Internet, www, URL, Web Browsers, web server, objectives of website, basic interface design, developing a story board for website, Navigation and links within website, checklist for designing.

Unit 2: Introduction to HTML  (08 periods)
Introduction to HTML, Basic elements, List- ordered/ Numbered list, Unordered/ Bulleted list, Definition list, Nesting list, Linking HTML pages, linking to URL, Text Formatting, Text Alignment, Character Styles, Fonts and Font Sizes, Using colors for the Web, preformatted text, Horizontal line, line break, Displaying special characters.

Unit 3: Images in HTML  (08 periods)
Images in HTML pages, Embedding inline images and external images, images and text alignment, images and links, alternative tags for images, using image as background, displaying images with heights and width dimensions, images preview, image for the
web, reducing file size of image file, decreasing the file size by reducing the colour depth of image file,

**Unit 4: Tables in HTML** (08 periods)

Introduction to tables, Features of tables, Tables in HTML, components of table, creating table, table cell and border, table and cell color,

**Unit 5: Frames, Image Maps** (08 periods)

Introduction to Frames, Creating frames, Frames attributes and linking of frames, complex framesets, Inline frames.

**Unit 6: Forms and CGI Scripts** (05 periods)

Introduction to forms, form design, text input fields, radio buttons, check box buttons, and submit button, additional layout features (select tag, Text AREA tag, and Hidden fields)

**Reference books:**

1. Web Publishing 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)
Paper- III
Programming with C

Course Code: OCA-103 [Marks: 50 Total Periods: 45]

Course Objectives:
1. The course is designed to provide complete knowledge of C language.
2. Develop a greater understanding of the issues involved in programming language design and implementation

Course Outcome:
1. Understand the fundamentals of C programming.
2. understating and to improve C programming skills.

Unit 1: Introduction to C
(08 periods)

Introduction, Character set, C tokens, Data types, Constant, Variables, declaration of storage class, Input / Output Statement, operators, Hierarchy of Operation, Structure of C program.

Unit 2: The Decision and Looping, Control Structure
(08 periods)

If Statement, If-Else statement, Nesting of If-Else, else-if ladder, Switch Statement, Go to.
While loop, Do-While loop, For loop.

Unit 3: Arrays and Pointers
(08 periods)

Introduction to Array, One-dimensional arrays: Declaration & Initialization, Two-dimensional arrays: Declaration & Initialization, Multi-dimensional arrays, Introduction, understanding pointers, accessing address of variable, declaring pointer variables, initialization of pointer variable

Unit 4: Storage Classes
(05 periods)

Automatic, Register, Static, Scope rules.

Unit 5: Functions
(08 periods)

Introduction, Definition of function, return values and their types, function calls, function declaration, recursion, passing arrays to functions, What are string, Standard Library string functions: strlen(), strcpy(), strcmp(), strcat().
Unit 6: Structure and Union (08 periods)

Introduction, defining a structure, defining a structure variable, accessing structure members, initialization of structure, structure within structure, union

Reference Books:

1. C programming by B. Gottfried, Schaum’s outline series
3. Let us C by Yeshwant Kanetkar, BPB Publication.
Theory: Paper No –IV
Introduction to Data Structures

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

Course Objectives:
1. To assess how the choice of data structures and algorithm design methods impacts the performance of programs.
2. 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.

Course Outcome:
1. Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
2. To impart the basic concepts of data structures and algorithms.

Unit-1: Role of Algorithms in Computing (08 periods)
Introduction, Algorithms as a technology, designing Algorithm, divide and conquer technique/ Approach

Unit-2: Introduction to Data Structure (08 periods)
Introduction, Elementary data organization, data structure operations, mathematical notations and functions, Algorithmic notations, control structure.

Unit-3: Linked List (08 periods)
Introduction, Representation of linked list in memory, Traversing, Searching, Unsorted link list, Inserting after given node, deleting node with a given item of information.

Unit-4: Stack and Queue (08 periods)
Introduction, Memory representation of Stack, Push and Pop operation
Queue: Introduction, Memory Representation, Insert & Delete operation.
Unit-5: Trees (08 Periods)

Introduction, Binary tree & it's Memory representation, Insertion & Deletion of nodes in binary tree, Threaded binary tree.

Unit-6: Graphs (05 periods)

Introduction, Memory Representation of graphs, types of graphs, Warshall’s Algorithm.

Text Book:

1. Data Structure by Lipschtz
2. An Introduction to Data Structure with Application by Jean Paul
Practical (Annual) Paper No. V

Course Code: OCA-105 (Lab) [Marks: 100]

Course Objectives:
1. Develop skills in analyzing the usability of a web site.
2. Develop a greater understanding of the issues involved in programming language design and implementation.

Course Outcome:
1. Be able to use the HTML programming language. Resolves written HTML codes.
2. Understand the fundamentals of C programming.

Laboratory Work based on Paper No. II & III

- At least 10 Practical’s based on Theory Paper No. II
- At least 10 Practical’s based on Theory Paper No. III