

॥ 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

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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.११/४७-२०२०च्या 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.

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.

स्वाक्षरित / -

उपकुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

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



Syllabus of

**Second Year B.Sc. Optional Computer Science
(Revised CBCS pattern)**

Introduced from Academic Year 2020-21

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

Syllabus of B. Sc. Second Year Computer Science (Optional)

(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	OCS-201	VI	Operating System	03	02	02	40	10	50
	OCS-202	VII	Programming in C++	03	02	02	40	10	50
	OCS-204	SEC-I	Skill Enhancement Course-I: A) Programming in SCILAB OR B) PC Installation & Networking	03	02	02	25	25	50
Sem-IV	OCS-205	VIII	Computer Network	03	02	02	40	10	50
	OCS-206	IX	Programming in Java	03	02	02	40	10	50
	OCS-208	SEC-II	Skill Enhancement Course-II: A) Web Applications OR B) Digital Media	03	02	02	25	25	50
Annual Practical	OCS-203	X	Practical's based on theory papers- VI & VII (OS and C++)	04	02	03	40	10	50
	OCS-207	XI	Practical's based on theory papers-VIII & IX (CN & Java)	04	02	03	40	10	50
Total				26	16		290	110	400

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.VI
Operating System

Course Code: OCS-201

[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. VII
Object Oriented Programming using C++

Course Code: OCS-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 completion of this course, students will be able to do programming independently and will also be able to build 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: OCS-204

[Marks: 50]

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

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.

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 Balsubramaniam, McGraw Hill Pub.
2. PC : Repair & Maintenance a practical guide by J Rosenthal, K Irwin
3. Easy PC Maintenance & Repair by Philip Laplante, McGraw Hill Pub.

Theory: Paper No. VIII
Computer Networks

Course Code: OCS-205

[Marks: 50 Total Periods: 45]

Course Objectives:

Understanding basics of computer networking, connectivity techniques and related protocols. This introduces the students to computer networks and concentrate on building a firm foundation for understanding data communication.

Course Outcome:

Students would be able to chose, escalate and establish a computer network

Unit I:

Periods: 15

Computer Network definition & Applications, Data Transmission Modes, Protocol Hierarchies, Design issues for layers, Connection Oriented & Connectionless services. Service Primitives. Network Models – OSI/ISO Reference Model & TCP/IP Model.

Unit II:

Periods: 10

Network Topologies, Network Devices - NIC Cards, Hub, Switch, Bridges, Wireless access points, Router, Gateways, Modems, Repeaters, Types of Networks.

Unit III:

Periods: 10

Magnetic Media, Twisted pair, Co-axial cable, fibre optics, radio transmission, Wireless transmission, Bluetooth. Structure of telephone system, Transmission & Switching. Email Architecture,

Unit IV:

Periods: 10

Network Protocols, Web server, Browsers, Domain Name System, introduction to IP addresses & IP Protocol, Introduction to Wi-Fi & 4G technology, Introduction to Security & Cryptography, Firewall.

Text/Reference Books:

1. Computer Networks by Andrew S Tanenbaum (PHI) 4th edition
2. Computer Networking & Internet by Fred Halsall, Addison Wesley
3. Computer Networks – A Systems approach by Peterson MK Publishers

Theory: Paper No. IX
Java Programming

Course Code: OCS-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: OCS-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: (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, Fundamentals 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, Fundamentals 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 Shipline

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

Course Code: OCS-203

[Marks: 50]

Course Objectives:

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management. To understand how C++ improves C with object-oriented features.

Course Outcome:

Student will be able to understand the basic components of a Linux operating system, and the interactions among the various components. Further, they will be able to independently program in C++ .

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

At least 20 (10 from each paper) practical exercises based on following guidelines:

1. Introduction to Linux
2. Linux Installation;
3. Simple Linux Commands: alias, at, banner, cat, cd, chmod, chown, chroot, cp, dd, grep, gzip, gunzip, kill, ln, ls, mail, man, mcopy, mdel, mkdir, more, ps, pwd, rm, rmdir, shutdown, sort, su, tar, unzip, vi, wc, who, whoami, zip.
4. Communication Commands: write, wall, talk, mesg, motd.
5. Administration Commands: adduser, cpio, fdformat, halt, hostname, ifconfig, login, logout, lpc, lpd, lprm, mount, mv, passwd, ping, quota, route, umount.
6. Shell Scripting;
7. Shell Programs.

C++ Practical List

1. Simple C++ Programs
2. Program in C++ using decision control structures
3. Program in C++ using looping statements
4. Program in C++ using Switch Statement
5. Program in C++ using functions
6. Program in C++ using a function with default arguments
7. Program in C++ using a class and member function defined outside the class
8. Program in C++ using Multiple Constructors in a class
9. Program in C++ using Object as function arguments
10. Program in C++ using Operator overloading
11. Program in C++ to Overload Unary Minus (-) Operator
12. Program in C++ to demonstrate Different types of Inheritance
13. Program in C++ to demonstrate Multiple Inheritance
14. Program in C++ to demonstrate Single Inheritance
15. Program in C++ using Static Data Members
16. Program in C++ to Demonstrate Use of File

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

Course Code: OCS-207

[Marks: 50]

Course Objectives:

1. To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
2. To learn why Java is useful for the design of desktop and web applications.

Course Outcome:

Students will gain expertise in some specific areas of networking such as the design and maintenance of individual networks. On completion of the course the student would be able to, use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.

Practical's based on theory papers- (CN & Java)

1. Network Setup
2. Configuring IP Addresses, Networking Commands, Setup Firewall & Configuration of Firewall, Server Configuration & services (Mail server etc)
3. Simple JAVA Programs
4. JAVA Programs using control structures
5. Program in JAVA using Two classes
6. Program in JAVA to demonstrate Command Line Arguments
7. Program in JAVA to demonstrate Method Overloading
8. Program in JAVA using Inheritance
9. Program in JAVA to Demonstrate Method Overriding
10. Program in JAVA using Interface
11. Program in JAVA using an Array
12. Program in JAVA to demonstrate String Methods
13. Program in JAVA using user Package
14. Program in JAVA using system package
- 15 Program in JAVA using constructors
16. Program in JAVA using Nesting of Methods