।। 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 तृतीय वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, मा. विद्याशाखेने **दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व दिनांक १२ जून २०२१ रोजी संपन्न झालेल्या ५१ व्या मा. विद्या परिषद बैठकीतील विषय क्र. २६/५१–२०२१**च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील तृतीय वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२१–२२ पासून लागू करण्यात येत आहेत.

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२१–२२/७५

दिनांक : १२.०७.२०२१.

स्वाक्षरित
सहा.कुलसचिव
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.
७) अधीक्षक, परिक्षा विभाग विज्ञान व तंत्रज्ञान विद्याशाखा प्रस्तुत विद्यापीठ.

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

Syllabus of

Third Year B.Sc. Optional Information technology
(Revised CBCS pattern)

Introduced from Academic Year 2021-22

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. T.Y.Optional Information Technology

(W. E. F. Academic Year 2021-2022)

Year/ Sem	Code	Paper	Title of Paper	Periods /Week	Credit	Exam Hrs.	Marks		
							Ext.	Int.	Tot.
Sem-V	OIT-301	XII	Software & Software Engineering	03	02	02	40	10	50
	OIT-302	XIII	Visual Basic Programming **OR** System Security	03	02	02	40	10	50
	OIT-303	SEC-III	**Skill Enhancement Course-III:** Data Mining **OR** Multimedia & Applications	03	02	02	25	25	50
Sem-VI	OIT-304	XIV	RDBMS & PL/SQL	03	02	02	40	10	50
	OIT-305	XV	E-Commerce Technology **OR** Cloud Computing Technology	03	02	02	40	10	50
	OIT-306	SEC-IV	**Skill Enhancement Course-IV:** Android Operating System **OR** Introduction to JavaScript	03	02	02	25	25	50
Practical's	OIT-307	XVI	Practical based on theory papers-**XII & XIII**	04	02	03	40	10	50
	OIT-308	XVII	Project Work	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).

Paper No. XII

Software & Software Engineering

Course Code: OIT-301 **[Marks: 50 Total Periods: 45]**

Course Objectives:

- Understand Software Engineering Process.
- Understand Techniques Software design & Software Development

Course Outcome:

1. To develop DFD using Software Engineering.

Unit-I: The Nature of Software & Software Engineering **15**

Software, Types of Software, Introduction to operating system, The Nature of Software, The Changing Nature of Software, Defining the Discipline, Software engineering process, Software engineering practice, Software Myths

Unit-II: Software Process Structure & Models **10**

A Generic process model, defining a framework activity, Process patterns, Process assessment & improvement, Prescriptive process models, Personal & team process models

Unit-III: Agility development & Human Aspects **10**

Introduction to Agility, Agility & Cost of Change, Agility principles, Extreme programming, Characteristics of Software engineer, Psychology of Software engineering, Software team structures.

Unit-IV: Understanding Requirements & Design Concepts **10**

Requirement Engineering ,Building the analysis model, Requirement Analysis, Design within the context of software engineering, The design process, Design model, Software Architecture, Element of quality assurance, Software testing fundamentals

Reference Books:

1. Software Engineering A practitioner's approach By Rogers S. Pressman, 8th Ed.(McGraw Hill)
2. Software Engineering A practitioner's approach By Rogers S. Pressman, 7th Ed.(McGraw Hill)
3. Software Engineering Principles and practices By Waman S. Jawadekar (Tata McGraw Hill)

Paper No. XIII

Visual Basic Programming

Course Code: OIT-302 **[Marks: 50 Total Periods: 45]**

Course Objectives:

- To Learning GUI Language.
- To develop an application using GUI Language

Course Outcome:

1. To develop simple application using Visual Basic

Unit-I: Getting Started with VB **10**

The IDE, The Elements of user interface, Designing user interface, Programming an Application Visual Development and Event Driven Programming.

Unit-II: Visual Basic The language **10**

Variable, Constants, operators, data types, arrays, collections, Procedures, control flow & loop statements.

Unit-III: Working with forms **10**

Form types, Appearance of forms, Form properties, Designing menu structure, Building dynamic forms at run time, Introduction to MDI forms.

Unit-IV: Basic Active X controls **15**

Label, TextBox, Frame, Command Button, CheckBox, Option Button, ComboBox, ListBox, HScrollBar,VScrollBar, Timer, DriveListBox, DirListBox, FileListBox, Shape & Line Controls – Properties & Methods.

Reference Books:

1. Mastering Visual Basic 6 by Evangelos Perroutosos (BPB Publications)
2. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill
3. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill

OR

Paper No. XIII

System Security

Course Code: OIT-302 **[Marks: 50 Total Periods: 45]**

Course Objectives:

- It also elaborates on the protection and security aspects.

Course Outcome:

Unit-I: Security Polices, Standards & Guidelines **10**

Different Types of polices standards & guidelines, Common Elements, Policy Standards & Guide development, Policy Creation, Regulatory Considerations.

Unit-II: Security Attacks, Services & Mechanisms **10**

Security Attacks, Services & Mechanisms, Security Services, A model for network security.

Unit-III: Conventional Encryption **10**

Conventional Encryption Techniques, Stegnography, Classical Encryption techniques.

Unit-IV: Intruders, Viruses, Worms & Firewall **15**

Intruders, Viruses & Related Threats, Introduction to Firewalls, Firewall design principles, Trusted Systems, Introduction to Antivirus.

References Books:

1. Security Architecture Design, Deployment & Operations by Cistopher M king, Curtis E. Dalton, T. Ertem Osmanoglu
2. Cryptography & Network Security Principles & Practice (Second Edition)

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

Data Mining

Course Code: OIT-303 **[Marks: 50]**

Course Objectives:
- To learn basic Data Mining

Course Outcome:
- Students will be able to understand the main features of the Data Mining.

Skill Enhancement Course-III: 304 (A) Data Mining

Unit-I: Introduction

Introduction: Data mining as a subject, what is Data mining, Definition, DBMS Vs Data mining, DM techniques, Issues and challenges in DM, DM application areas?

Unit-II: Data warehousing

Data warehousing: Introduction, Definition, OLAP operation, warehouse schema, Data warehouse architecture, metadata, data ware house usage

Unit-III: Data pre-processing

Data pre-processing, Data cleaning, Data integration, Data transformation, Data reduction.

Unit-IV: An application

Understanding basic techniques in Classification, Prediction, Clustering and Association Rules

Reference Books:

1. Data mining Techniques by Arun K Pujari.
2. Data mining concepts and techniques 2nd ed. By Jawei Han & Micheline Kamber.
3. Data mining- Introductory and Advanced Topics, Margaret H Dunham, Pearson Education

OR

Skill Enhancement Course-III

Multimedia and Applications

Course Code: OIT-303 **[Marks: 50]**

Unit-I: Introduction to multimedia

Introduction to multimedia, elements of multimedia, multimedia and hypermedia, characteristics of multimedia, hardware and software requirement, uses of multimedia, WWW, multimedia software tools.

Unit-II: Text

Text: Introduction, types of text, Unicode standard, insertion of text, text compression, text file formats, image file format (bmp, jpg, png).

Unit-III: Introduction to graphics

Introduction to graphics, advantages and uses of graphics, Audio-introduction, Components of audio system, digital audio processing, and Audio file formats.

Unit-IV: Video-introduction

Video-introduction, Motion Video, Analog Video Camera, Digital Video, Digital Video Processing, Storage formats, video file format.

Reference Books:

1. Principles of multimedia 2nd edition by Ranjan Parekh, Tata McGraw-Hill
2. Fundamentals of multimedia by Ze-Nian Li and mark S. Drew
3. Introduction to Multimedia and its Application by Ramesh Jain

Paper No. XIV

RDBMS & PL/SQL

Course Code: OIT-304 **[Marks: 50 Total Periods: 45]**

Course Objectives:

- To Learn Database Management System & database languages
- To develop an application using PL/SQL

Course Outcome:

- To develop simple application using PL/SQL

Unit-I: Introduction **10**

Introduction to DBMS, Applications of DBMS, Data Models, Database Architecture, Database Users & Administrators, Entity, Attributes & Entity Set, Database Languages, DDL,DML,DCL.

Unit-II: Relational Algebra and Calculus: **10**

Introduction to Selection, Projection, Union, and Joins, introduction to SQL, Basic SQL Query and Examples of SQL Queries: select, where, from, Introduction to views, Aggregate Operators Group by & Order by Clause.

Unit-III: Integrity Constraints **10**

Introduction, Domain Constraint, Primary Key, Unique Key, Foreign Key

Unit-IV: Introduction to PL/SQL **15**

Introduction, Architecture of PL/SQL, Data types, operators, Decision making and looping statements, Simple PL/SQL programs, Introduction to Triggers.

Reference Books:

1. SQL, PL/SQL the programming language of ORACLE 4th Edition, Ivan Bayross
2. An Introduction to Database Systems, Bipin C Desai , Galgotia Publication

Paper No. XV

E-Commerce Technology

Course Code: OIT-305 **[Marks: 50 Total Periods: 45]**

Course Objectives:

- To Learn Internet & E-Commerce Technology
- To Learn the application of Scientific knowledge for practical purpose.

Course Outcome:

- It is very easily to view/purchase/sell using e-commerce websites.

Unit-I: Electronic Commerce **10**

Introduction, E-Commerce types, Value Added Networks, Electronic commerce over the Internet.

Unit-II: Intranet **10**

Introduction to Intranet, Intranet services, Intranet Implementation.

Unit-III: Internet **10**

Internet-Introduction, Internet Engineering Task Force, Internet Architecture Board, Internet Communication Protocols, Internet Search Tools: Telnet, FTP, World Wide Web. Gopher, HTTP, Concerns about Internet.

Unit-IV: Electronic Data Interchange **15**

EDI introduction, Cost & Benefits of EDI, Components of EDI Systems: EDI Standards, EDI Software's, EDI Communication Networks, EAN system, EAN/COM, Article numbering system, Bar-coding, Serial Shipping Container Code & EAN label.

References Books:

1. E-commerce (The cutting Edge of Business) by Kamlesh K. bajaj and Debjani Nag. Ist & IInd Edition (Tata McGraw Hill publication.)

OR

Paper No. XV

Cloud Computing Technology

Course Code: OIT-305 **[Marks: 50 Total Periods: 45]**

Course Objectives:

- To learn technologies associated with today's top cloud platforms.

Course Outcome:

- Implement simple cloud programs to solve simple problems.

Unit-I: Enterprise Computing: A Retrospective **10**

Introduction, Mainframe architecture, Client-server architecture, 3-tier architectures with TP monitors

Unit-II: The Internet as a Platform **10**

Internet technology and web-enabled applications, Web application servers, Internet of services

Unit-III: Software as a Service & Cloud Computing **10**

Emergence of Software as a Service (SaaS), Successful SaaS architectures, Dev 2.0 platforms, Cloud computing, Dev 2.0 in the cloud for enterprises

Unit-IV: Cloud Computing Platforms **15**

Infrastructure as a service (IaaS): Amazon EC2, Platform as a service (PaaS): Google App Engine, Microsoft Azure, Introduction to Web Services, AJAX & Mashups: user interface services

Reference Books:

1. Enterprise Cloud Computing: Technology, Architecture, Application By Gautam Shroff
2. Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte publication McGraw Hill

Paper No. SEC-IV
Skill Enhancement Course-IV

Android Operating System

Course Code: OIT-306 **[Marks: 50]**

Course Objectives:

- To learn new platform

Course Outcome:

- Seek Jobs in emerging IT support sector

Unit-I: Introduction **10**

History of Android, Introduction to Android Operating System, Android Development tools, Android Architecture.

Unit-II: Overview of Object Oriented Programming Using Java **10**

OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract Class, Threads, Overloading and Overriding, Java Virtual Machine.

Unit-III: Development Tools **10**

Installing Virtual Machine for Android Ice-cream Sandwich/Jellybean, configuring the installed tools, creating a android project- Hello word, run on emulator, Deploy it on USB-connected android device.

Unit-IV: User Interface Design **15**

Form widgets, Text fields, Layouts, Button control, toggle buttons, spinners, Images, Menu and dialog.

Reference Books:

1. Android application development for java programmers by James C. Sheusi, publisher Cengage Learning, 2013.

OR
Paper No. SEC-IV
Skill Enhancement Course-IV

Introduction to JavaScript

Course Code: OIT-306 **[Marks: 50]**

Course Objectives:

- To learn Scripting language

Course Outcome:

- To develop application using JavaScript Language.

Unit-I: JavaScript-Overview **10**

Definition, Client-side JavaScript, advantage, limitations of JavaScript, JavaScript development tools.

Unit-II: JavaScript-Syntax & Enabling **10**

First JavaScript Code, Whitespace and line breaks, semicolons are optional, case sensitivity, comments in JavaScript, JavaScript in IE, JavaScript in Google Chrome, Warning for Non-JavaScript browsers.

Unit-III: JavaScript- Placement **10**

JavaScript in <head>……</head> section, <body>……</body> , <body> and <head> sections, JavaScript in external files.

Unit-IV: JavaScript- Control Statements **15**

JavaScript Data types, Variables, operators, if…else, switch-case, while, do…while & for loop , break and continue statements.

Reference e-Books:

1. https://matfuvit.github.io/UVIT/predavanja/literatura/TutorialsPoint%20JavaScript.pdf

Paper No. XVI
Practical Based on theory papers – XII & XIII

Course Code: OIT-307 **Marks: 50**

Course Objectives:

Give hands on training to the students and make them acquainted with various Real time Applications implemented currently in the Industry.

Course Outcome:

- To develop simple application using Visual Basic

Objective:

- At least 20 practical sessions based on paper no XII and XIII.

Paper No. XVII

Course Code: OIT-308 **Marks: 50**

Course Objectives:

Give hands on training to the students and make them acquainted with various Real time Applications implemented currently in the Industry.

Course Outcome:

- To develop applications implemented in the colleges.

Objective: Give hands on training to the students and make them acquainted with various Real time Applications implemented currently in the Industry.

Project Work

- Maximum a group of 03 students are allowed to work on a project.
- Project Synopsis should be submitted by the students to their concern faculty and a declaration should be submitted by the students regarding the originality of work.
- Project report should prepared by the students & it should be certified by concern faculty & head of the department.
- Students should submit one hardcopy of report with CD/DVD/Pendrive to the department.

Distribution of marks for project is as

Project Work:	30
Project Viva:	10
Project Report:	10
Total Marks:	**50**