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

Syllabus of

Third Year B.Sc. Optional Computer Application
(Revised CBCS pattern)

Introduced from Academic Year 2021-22

B.Sc. Optional Computer Application

B.Sc. Optional Computer Application (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 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, NANDED

CHOICE BASED CREDIT SYSTEM (CBCS)

SEMESTER PATTERN

Faculty of Science & Technology

Under Graduate (UG) Program

Curriculum of B.Sc. T.Y.Optional Computer Application

(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	OCA-301	XII	Introduction to Soft Computing	03	02	02	40	10	50
	OCA-302	XIII	Programming in Visual Basic **OR** Information Computer System Security	03	02	02	40	10	50
	OCA-303	SEC-III	**Skill Enhancement Course-III:** Clint-Side Scripting Language-JavaScript **OR** Introduction to Android Operating System	03	02	02	25	25	50
Sem-VI	OCA-304	XIV	Digital Image Processing	03	02	02	40	10	50
	OCA-305	XV	Internet & E-Commerce Technology **OR** Cloud Computing Platform	03	02	02	40	10	50
	OCA-306	SEC-IV	**Skill Enhancement Course-IV:** Data Mining & Data Warehousing **OR** Application of Multimedia Software	03	02	02	25	25	50
Practical's	OCA-307	XVI	Practical based on theory papers-**XII & XIII**	04	02	03	40	10	50
	OCA-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

Introduction to Soft Computing

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

Course Objectives:

- Understanding nature of problems solved with Soft Computing
- Understanding components of Soft Computing.

Course Outcome:

- Students will be inspired to solve complex real-world problems.

Unit-I: Introduction **15**

Soft Computing- Definition, Scope of Soft Computing, Various components under Soft Computing, Introduction to Neural Network, Fuzzy Logic, Genetic Algorithm & Hybrid system.

Unit-II: Artificial Neural Network **10**

Introduction to Artificial Neural Network, Biological Neural Network, Brain Vs Computer – Comparison between Biological Neuron and Artificial Neuron, Evolution of Neural Network, Basic Models of Artificial Neural Network, Connections, Learning- Supervised, Unsupervised Learning & Reinforcement Learning, Activation function.

Unit-III: Important Terminologies of ANNs **10**

Weights, Bias, Threshold, Learning Rate, Momentum Factor, Vigilance Parameter, Notations, McCulloch-Pitts Neuron- Theory, Architecture.

Unit-IV: MATLAB Environment for Soft Computing **10**

Introduction to MATLAB, Matrices and Vectors, Introduction to Simulink, MATLAB Neural Network Toolbox- Creating a Custom Neural Network, Commands in Neural Network Toolbox, Neural Network Graphical User Interface Toolbox.

Reference Books:

1. Principal of Soft Computing by S.N.Sivanandam, S.N.Deepa (Wiley India)

Paper No. XIII

Programming in Visual Basic

Course Code: OCA-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

Information Computer System Security

Course Code: OCA-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

Introduction to Android Operating System

Course Code: OCA-303 **[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-III
Skill Enhancement Course-III

Clint-Side Scripting Language- JavaScript

Course Code: OCA-303 **[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. XIV

Digital Image Processing

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

Course Objectives:

- To Learn image processing fundaments.

Course Outcome:

- Student will be able to tackle problems of Digital Image Processing

Unit-I: Introduction to Image Processing System **10**

Image Sampling, Quantisation, Resolution, Human Visual System, classification of Digital Images, Image Types, Elements of an Image-processing System, Image file formats, Applications of Digital Image Processing.

Unit-II: 2D Signals and Systems **10**

2D Signals, Separable Sequence, Periodic Sequence, 2D systems, Classification of 2D Systems, 2D Convolution, 2D Digital Filter.

Unit-III: Convolution and Correlation **10**

2D Convolution Through Graphical Method, Convolution Through Z-Transform, 2D Convolution Through Matrix Analysis, Circular Convolution Through Matrix Method, Application of Circular Convolution, 2D Correlation.

Unit-IV: Image Transforms, Enhancement, Restoration and Denoising **15**

Need for Transform, Image Transform, Fourier Transform, Image Enhancement in Spatial Domain, Enhancement through Point Operation, Types of Point Operation, Image Degradation, Types of Image Blur, Classification of Image-restoration Techniques, Image-restoration model.

Reference Books:

1. Digital Image Processing by S. Jayraman, S Esakkirajan & T Veerakumar (McGraw Hill)

Paper No. XV

Internet & E-Commerce Technology

Course Code: OCA-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 Platform

Course Code: OCA-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-III
Skill Enhancement Course-III:

Data Mining & Data Warehousing

Course Code: OCA-306 **[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: 306 (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

Application of Multimedia Software

Course Code: OCA-306 **[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. XVI
Practical Based on theory papers – XII & XIII

Course Code: OCA-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: OCA-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**