SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
CHOICE BASED CREDIT SYSTEM (CBCS)
SEMESTER PATTERN
Faculty of Science & Technology
Under Graduate (UG) Programmes
COMPUTER SCIENCE (OPTIONAL) - CURRICULUM
(W. E. F. Academic Year 2018-2019)
CLASS: B. Sc. Third Year
OUTLINE

Semester pattern	Section and course code	Paper No. & Title	Periods /Week	Marks for		Total Credits (Marks)
				External Marks: ESE (Theory)	Internal: CA & SECCS	
Semester-V	**Section-A DECC**	**Theory Paper No.XII** Software Engineering	**03**	**40**	**10**	Credits: 02 (Marks:50)
	Section-B DECC (Elective)	**Theory Paper No. XIII[A]** Visual Programming **OR** **Theory Paper No. XIII[B]** Cloud Computing	**03**	**40**	**10**	Credits: 02 (Marks:50)
	Section-A SECCS-III	**Skill Enhancement Course-III:** Data Mining **OR** Multimedia and Applications	**03**	**25**	**25**	Credits: 02 (Marks:50)
Semester-VI	**Section-A DECC**	**Theory Paper-XIV** Relational Database Management Systems & PL/SQL	**03**	**40**	**10**	Credits: 02 (Marks:50)
	Section-B DECC (Elective)	**Theory Paper No. XV[A]** Computer System Security **OR** **Theory Paper No. XV[B]** E-Commerce	**03**	**40**	**10**	Credits: 02 (Marks:50)
	Section-B SECCS-IV	**Skill Enhancement Course-IV:** Office Automation Tools **OR** Android Programming	**03**	**25**	**25**	Credits: 02 (Marks:50)
Practical	**Section-A CCCSP**	**Paper No. XVI Laboratory Course Work-IV:** Practical based on theory papers-**XII & XIII**	**04**	**50**	**--**	Credits: 02 (Marks:50)
	Section-B CCCSP	**Paper No. XVII Laboratory Course Work-V:** Project Work	**04**	**50**	**NA**	Credits: 02 (Marks:50)
	ESE Marks:260	**SECCS+CA Marks:100+40=140**	**Credits:16 Marks:400**	NA	NA	NA
	ESE Marks:260	**SECCS+CA Marks:100+40=140**	**Credits:16 Marks:400**	NA	NA	NA
			Total	**ESE Marks:260**	**SECCS+CA Marks:100+40 =140**	**Credits:16 Marks:400**

DECC: Discipline Elective Core Course, **CCCSP**: Core Course Computer Science Practical, **SECCS**- Skill Enhancement Course Computer Science, **ESE**: End Semester Examination, **CA**: Continuous Assessment

Note: A practical group / batch for practical papers is recommended to have 10-15 students as per the UGC Guidelines under CBCS (Choice Based Credit System) – May 2015

Outline and Salient Feature:

B. Sc. Third year Computer Science syllabus is crafted to serve the need of Choice Based Credit System. This is a new perspective for academic content delivery where students can pick electives as per their desire. This syllabi structure is reframed with aim to familiarize and practically train students in the field of Computer Science. The course structure is specifically bringing discipline elective (DECC) and skilled enhanced courses together there by providing additional domain knowledge in the field. Some DECC courses like Software Engineering; Visual Programming and Cloud Computing are concerned with basics of software developments and essential things to undertake professional software project management. Through a wide range of electives, students keep pace with the latest trends in computing technology. Furthermore, the curriculum devotes sufficient practical experience to help students integrate and practise principles and techniques learned in the classroom and develop the necessary maturity and soft skills essential for a successful career in information technology.

Utility:

1. A sound technical foundation in computer science and the ability to creatively apply computer and related technologies to practical problems
2. Knowledge in specialized areas with awareness of multi-disciplinary issues,
3. Apply relevant logic, analytics, mathematics and engineering methods to computing;
4. Use computer programming for problem solving
5. Identify problems, analyze requirements, formulate design and implement solutions that meet realistic constraints, such as costs, operational, social, cultural, ethical, health and safety by conversancy with software engineering methods and tools for developing quality software solutions;
6. Develop projects effectively and independently, apply specialized knowledge in selected area(s) of Computer Science;

Prerequisite:

The course is offered for a student registered for third year of undergraduate programme in Computer Science, under the faculty of Science and Technology. The prerequisite includes S.Y in concerned program along with good knowledge of software and hardware.

Paper No. XII

Software Engineering

Silent Features: Software engineering is art of software designing. It aims to prepare detailed plans and designs as per customer's demands, carry out testing, develop intuitive user interfaces, and integrate all these activities into a system.

Learning Objectives:

- Understand Software Engineering Process.
- Understand Requirements and components of Software Engineering.
- Understand software design and software testing fundamentals.

Utility of the course: Confidence of becoming a Software developer in order to get placement as well as in research activities

Prerequisite: Knowledge of Software

Unit 01: The Nature of Software & Software Engineering

The Nature of Software, The Changing Nature of Software, Defining the Discipline, Software engineering process, Software engineering practice, Software Myths

Unit 02: Software Process Structure & Models

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

Unit 03: Agility development & Human Aspects

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

Unit 04: Understanding Requirements & Design Concepts

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 [A]

Visual Programming

Silent Features: Visual Basics is a Graphical User Interface language. We can design various forms and reports by drag and drop models. It is very convenient platform of modern software designing.

Learning Objectives:

- To learn Graphical User Interface Language.
- To develop an application using GUI Language.
- Implement VB programs to solve simple problems.

Utility of the course: Confidence of becoming a Software developer in order to get placement as well as in research activities

Prerequisite: Knowledge of programming

Unit 01: Getting Started with VB

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

Unit 02: Visual Basic The language

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

Unit 03: Working with forms

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

Unit 04: Basic Active X controls

Command button, control-properties, Text Box control- properties, List Box & Combo Box control - properties, combo Box control-properties, Scroll Bar control-properties, Slider control-properties, Understanding Visual data manager.

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

Paper No. XIII [B]

Cloud Computing

Silent Features: It is most demanding area in IT industry. Every organization now days, trying to migrate to cloud computing from different perspectives. It is associated with architectural modelling and service providing. Other areas like resource pooling, cost economics, elasticity of organisation also use clouds. Thus it has become extremely important to understand the key defining features of cloud computing.

Learning Objectives:

- To Study basics of cloud computing, and comprehend the terminology, tools and technologies associated with today's top cloud platforms.
- To provide the programmer's perspective of working of Cloud Computing.
- Implement Simple Cloud programs to solve simple problems.

Utility of the course: Awareness of existing demanding trends for Clouds and Virtualizations in the IT industry in order to get placement as well as in research

Prerequisite: Knowledge about Computer Hardware and Networking.

Unit 01: Enterprise Computing: A Retrospective

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

Unit 02: The Internet as a Platform

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

Unit 03: Software as a Service & Cloud Computing

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 04: Cloud Computing Platforms

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

Skill Enhancement Course-III (SECCS-III)

Data Mining

Silent Features: Data mining is basically concerned with the analysis of data using software techniques. Data mining is the process of detecting hidden facts and interrelations in large data which otherwise invisible directly.

Objectives:

- To create awareness about self-employment and motivate the students to go for self-employment by becoming Data Analytics.
- To familiarize the students to the practical world of business data processing and decision making.

Utility of the course: Awareness of existing demanding trends in IT industry in order to get placement as well as in research.

Prerequisite: Knowledge of database management system is essential.

Unit 01: 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 02: Data warehousing

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

Unit 03: Data pre-processing

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

Unit 04: 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

Skill Enhancement Course-III (SECCS-III)

Multimedia and Applications

Silent Features: Multimedia is combination of text, graphics, sound, animation, and video that is delivered interactively to the user by electronic or digitally manipulated means. Animation is one of the applications of multimedia. This course formally introduces various elements of multimedia to students. This course focuses on topics in multimedia information representation and relevant signal processing aspects, multimedia networking and communications, and multimedia standards especially on the audio, image and video compression. All of these topics are important in multimedia industries.

Objectives: The objective of this course is to provide students with a basic understanding of multimedia systems. With such background equipment, students would be able to evaluate more advanced or future multimedia systems. This course will also stimulate students' interest in the course and further motivate them towards developing their career in the area of multimedia and internet applications.

Utility of the course: Develop projects effectively and independently, apply specialized knowledge in selected area(s) of Computer Science

Prerequisite: Knowledge of software is essential.

Unit 01: 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 02: Text

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

Unit 03: 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 04: 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

Laboratory Course Work- IV

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

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

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

Paper No. XIV

Relational Database Management Systems & PL/SQL

Silent Features: The Relational model is a fundamental DBMS model. RDBMS alone can give good placement to students in IT industry. RDBMS comes in the form of a package. We simply need to learn "how to use and manage it". There is huge scope to RDBMS. The RDBMS is critical whenever you are managing large amounts of data. Virtually RDBMS comes in picture anywhere where large amounts of complex data are generated or analyzed like Banks, Government Records/Depositories, etc.

Learning Objectives:

- To learn Relational Database Management system and database languages.
- To learn Relational Algebra and Calculus.
- To study Integrity Constraints and PL/SQL
- To develop an application using PL/SQL.

Utility of the course: To get a good job in DBMS, students must have good knowledge of RDBMS, any 4 GL, Networking Concepts, Operating System Concepts and Web related issues. The ORACLE / MAINFRAME are the popular DBMS technologies students should learn and master. The students are also encouraged to appear for OCP / OCA – DBA certification examinations.

Prerequisite: Knowledge of DBMS

Unit 01: Introduction

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

Unit 02: Relational Algebra and Calculus:

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 03: Integrity Constraints

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

Unit 04: Introduction to PL/SQL

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 [A]

Computer System Security

Silent Features: Computer security has become a major concern for all users and manufacturers around the world. The security deals with procedures and algorithms to avoid attacks or to bring down the attacks. Knowledge of computer security is extreme need of time.

Learning Objectives:

- The Course shall introduce the Computer System Security Concepts and its use in the Information Technology industry.
- It also elaborates on various types of attacks and their mitigation.

Utility of the course: Awareness of existing demanding trends in IT industry in order to get placement as well as in research

Prerequisite: Knowledge of Networking is essentials.

Unit 01: Security Polices, Standards & Guidelines

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

Unit 02: Security Attacks, Services & Mechanisms

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

Unit 03: Conventional Encryption

Conventional Encryption Techniques, Stegnography, Classical Encryption techniques.

Unit 04: Intruders, Viruses, Worms & Firewall

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. XV [B]

E-Commerce

Silent Features: E-commerce is a new revolution in the traditional market place where people buy from internet. Online purchase from Amazon, Snapdeal, Flipkart, etc comes under e-commerce. This course introduces common terminology related with e-commerce and their work association.

Learning Objectives:

- To learn Electronic Commerce market place and Internet.
- Understand Electronic Data Interchange.

Utility of the course: Job opportunities in BPO, E-commerce companies, Logistics companies, E-commerce framework consultant

Prerequisite: Knowledge of Internet is essentials.

Unit 01: Electronic Commerce

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

Unit 02: Intranet

Introduction to Intranet, Intranet services, Intranet Implementation.

Unit 03: Internet

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 04: Electronic Data Interchange

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.)

Skill Enhancement Course-IV (SECCS-IV)

Office Automation Tools

Silent Features: Office automation refers to the integration of office functions usually related to managing information. Now days all offices have been computerised. This course would enable the students in crafting professional word documents; excel spread sheets, power point presentations using the Microsoft suite of office tools.

Objectives:

- Seek Jobs in emerging BPO/IT Support Sector.
- To familiarize the students in preparation of documents and presentations with office automation tools. Broadly, b learning the course, the students will be able to perform documentation , to perform accounting operations and to perform presentation skills

Utility of the course: Awareness of existing demanding trends in IT industry in order to get placement as well as in research.

Prerequisite: Knowledge of basic computer software is essential.

Unit 01: Introduction to MS Office

Introduction to MS Office, Characteristics of office automation system, Goals of office automation.

Unit 02: Introduction to MS Word

Introduction to MS Word, Opening screen of word, Creating document, Typing text, Formatting text, Editing text, Line Spacing, Borders and shading, Inserting headers and footers, Creating tables, inserting graphics, Drawing objects.

Unit 03: Introduction to MS Excel

MS Excel, Opening screen of Excel, Functions in excel, Creating worksheets, Printing Worksheets, Creating and printing charts.

Unit 04: Introduction to PowerPoint

PowerPoint Basic Terminology, Creating presentations, Auto content wizard, Using blank presentation option, Using design template option, Adding slides, Deleting slides, Importing images, drawing in PowerPoint, numbering a slide, saving presentation, printing presentation.

Reference Books:

1. PC Software Made Simple by R.K Taxali

2. Office 2010 course complete book, Prof. Satish Jain, Kratika, M.Geetha, BPB Publication

Skill Enhancement Course-IV (SECCS-IV)

Android Programming

Silent Features: Android is a powerful Operating System supporting a large number of applications in Smart Phones. Android programming course teaches students how to develop applications for the Android operating system. This course is designed for students who are new to programming, and want to learn how to develop Android apps. They will learn how to create an Android project anlong with Android architecture and the key principles underlying its design.

Objectives:

- This course shall build a platform for students to start their own enterprise
- To gain an understanding of the processes that are involved in an Android developed application
- To become familiar with Android development tools and user interface.
- Ability to build two simple apps that you can share with your friends

Utility of the course:

- Awareness of existing demanding trends in IT industry in order to get placement & research.
- Understand the Android OS architecture.
- Install and use appropriate tools for Android development, including IDE, device emulator, and profiling tools.
- Understand the Android application architecture, including the roles of the task stack, activities, & services.
- Build user interfaces with fragments, views, form widgets, text input, lists, tables, and more.

Prerequisite: Basic of Operating System covered last year semester.

Unit 01: Introduction

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

Unit 02: Overview of Object Oriented Programming Using Java

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

Unit 03: Development Tools

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 04: User Interface Design

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.

Laboratory Course Work- V

Paper No. XVII

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 to the department.

Distribution of marks for project is as

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