

॥ 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 पदव्युत्तर 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 पदव्युत्तर 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. M.Sc.-II Year-Botany
2. M.Sc.-II Year-Herbal Medicine
3. M.Sc.-II Year-Analytical Chemistry
4. M.Sc.-II Year-Biochemistry
5. M.Sc.-II Year-Organic Chemistry
6. M.Sc.-II Year-Physical Chemistry
7. M.Sc.-II Year-Computer Management
8. M.Sc.-II Year-Computer Science
9. M.Sc.-II Year-Information Technology
10. M.C.A. (Master of Computer Applications)-II Year
11. M.Sc.-II Year-Software Engineering
12. M.Sc.-II Year-System Administration & Networking
13. M.Sc.-II Year-Dairy Science
14. M.Sc.-II Year-Environmental Science
15. M.Sc.-II Year-Applied Mathematics
16. M.Sc.-II Year-Mathematics
17. M.Sc.-II Year-Microbiology
18. M.Sc.-II Year-Physics
19. M.Sc.-II Year-Zoology
20. M.Sc.-II Year-Biotechnology
21. M.Sc.-II Year-Bioinformatics

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/पदव्युत्तर-सीबीसीएस अभ्यासक्रम/
२०२०-२१/३३५

दिनांक : १६.०७.२०२०.

प्रत माहिती व पुढील कार्यवाहीस्तव :

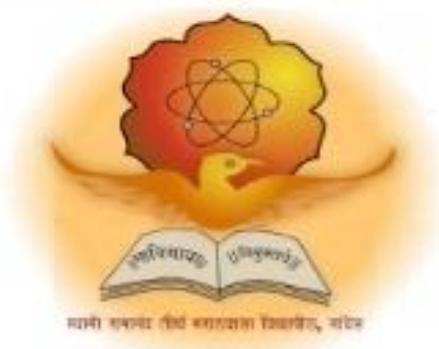
- १) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
- ५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत 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 M.Sc. (Computer Management)
(Revised CBCS pattern)

Introduced from Academic Year 2020-2021

M.Sc. Computer Management

M.Sc. Computer Management (2years) program / degree is a specialized program in Computer Management and software development processes issues. It builds the student on higher studies and research awareness in overall designing and development of software so as to become competent in the current race and development of new computational sciences. The duration of the study is of four semesters, which is normally completed in two years.

CBCS pattern

The M.Sc. Computer Management 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 **M.Sc. Computer Management** 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. There are 25 credits per semester. A total of 100 credits are essential to complete this program successfully. The Grading pattern to evaluate the performance of a student is as per the University rules.

Every semester has a combination of Theory (core or elective) courses and Lab courses. Each theory course has 04 credits which are split as 02 external credits and 02 internal credits. The university shall conduct the end semester examination for 02 external credits. For theory internal credit, student has to appear for 02 class test (15 marks) and 01 assignment (20 marks). Every lab course has 02 credits which are split as 01 external credit and 01 internal credit. For lab internal credit, the student has to submit Laboratory Book (05 marks) and remaining 20 marks are for the Lab activities carried out by the student throughout the semester. For lab external credit, 20 marks are reserved for the examinational experiment and 05 marks are for the oral / viva examinations. There is a special skill based activity of 01 internal credits per semester which shall inculcate awareness regarding the domain of computers, IT, and ICT.

The open elective has 04 credits which are purely internal. If students are opting for MOOCs as open elective, then, there must be a Faculty designed as MOOCs course coordinator who shall supervise learning through MOOCs. This is intentionally needed as the MOOCs course coordinator shall verify the MOOC details including its duration, starting date, ending date, syllabus contents, mode of conduction, infrastructure feasibility, and financial feasibility during start of each semester. This is precautionary as the offering of the MOOCs through online platforms are time specific and there must be proper synchronization of semester duration with the MOOCs duration. Students must opt for either institutional / college level open elective or a course from University recognized MOOCs platforms as open electives.

The number of hours needed for completion of theory and practical courses as well as the passing rules, grading patterns, question paper pattern, number of students in practical batches, etc shall be as per the recommendations, norms, guidelines and policies of the UGC, State Government and the SRTM University currently operational. The course structure is supplemented with split up in units and minimum numbers of hours needed for completion of the course, wherever possible.

Under the CBCS pattern, students would graduate **M.Sc. Computer Management** with a minimum number of required credits which includes compulsory credits from core courses, open electives and program specific elective course. All students have to undergo lab / practical activities leading to specific credits and project development activity as a part of professional UG program.

1. **M.Sc. Computer Management** Degree / program would be of 100 Credits. Total credits per semester= 25
2. Each semester shall consist of three core courses, one elective course, one open elective course and two practical courses. Four theory courses (core+elective) = 16 Credits. Two practical / Lab courses= 4 Credits in total (02 credits each) , One Open elective= 4 credit, One skill enhancement activity of 01 credits.
3. enhancement activity of 01 credits.
4. One Credit = 25 marks , Two Credits = 50 Marks, Four Credits = 100 Marks

PEO, PO and CO Mappings

1. **Program Name** : M.Sc.(CM)
2. **Program Educational Objectives:** After completion of this program, the graduates / students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II : Successful Career	Deliver professional services with updated technologies in software engineer based career.
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.

3. **Program Outcome(s):** Students / graduates will be able to

- PO1:** Apply knowledge of mathematics, science and algorithm in solving Computer problems.
PO2: Generate solutions by understanding underlying Computer Management environment
PO3: Design component, or processes to meet the needs within realistic constraints.
PO4: Identify, formulate, and solve problems using computational temperaments.
PO5: Comprehend professional and ethical responsibility in computing profession.
PO6: Express effective communication skills.
PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.
PO8: Actual hands on technology to understand it's working.
PO9: Knowledge of contemporary issues and emerging developments in computing profession.
PO10: Utilize the techniques, skills and modern tools, for actual development process
PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work
PO12: Research insights and conduct research in computing environment

1. **Course Outcome(s):** Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

2. Mapping of PEO& PO and CO

Program Educational Objectives	Thrust Area	Program Outcome	Course Outcome
PEO I	Technical Expertise	PO1,PO2,PO3,PO6	All core courses
PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

The detailed syllabus is as below,

M.Sc.(CM)

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Third Semester						
1.	Core Subjects	CM-301	Advanced Java Programming	2	2	4
2		CM-302	Software Engineering	2	2	4
3		CM-303	Information Security and Audit	2	2	4
Choose any one from below elective subjects						
4	Elective Subject	CM-304 A	System Administration and Server Integration	2	2	4
		CM-304 B	Server and Desktop Technologies			
Practical /Lab						
5	Lab / Practical	CM-305	Lab-5: Based on CM-301	1	1	2
		CM-306	Lab-6: Based on Elective Subjects	1	1	2
6	Open Elective	CM-307A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		CM-307 B	Technical Writings			
7	Skill based Activity	CM-308	SK-03: Seminar Presentation Activity	1	0	1
	Total credits					25

M.Sc.(CM)

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Fourth Semester						
1.	Core Subjects	CM-401	Software Testing	2	2	4
2		CM-402	ASP.NET using VB.NET	2	2	4
3		CM-403	Major Project development Activity	0	4	4
Choose any one from below elective subjects						
4	Elective Subject	CM-404 A	Software Project Management	2	2	4
		CM-404 B	Mobile Application Development			
Practical /Lab						
5	Lab / Practical	CM-405	Lab-7: Based on CM-402	1	1	2
		CM-406	Lab-8: Based on Elective Subjects	1	1	2
6	Open Elective	CM-407A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		CM-407 B	Information Communication Technology			
7	Skill based Activity	CM-408	SK-04	1	0	1
	Total credits					25

CM-301 : Advanced Java Programming

Course Objectives

Objective of this course is to introduce the students to some concepts of advanced programming and practice on reusing components. It focuses on Graphical User Interface (GUI), networking, and database manipulation. Discuss the principles of inheritance and polymorphism and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces.

Course Outcomes

With this course Students should be able to Learn the Internet Programming, using JApplets. Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) and Swings. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC). Create dynamic web pages, using Servlets and JSP. Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).

Course Contents

Unit-1 Introduction to java:

History, Features, Java program structure, Java tokens, Java Statements, Java virtual machine, Command line arguments, Constants, Variable, Data types, Decision making and branching, looping, Class, Methods, Objects, Method overloading, Nesting of methods

Unit-2 Inheritance and System packages

Overriding methods, Final variables, Final methods, Final Classes, Abstract methods, Abstract Classes, Visibility Control, Arrays, Strings, Vectors, Naming conventions, Creating and accessing packages, Introduction to multithreaded programming, Creating and extending threads, Life cycle of thread, Thread exception, Thread priority, Synchronization, Exception handling, Multiple catch statements, finally statement, Throwing our own exceptions, Exception for debugging

Unit-3: Applets and Graphics

Applet code, Applet life cycle, creating an executable applet, designing a web page, Applet tag, passing parameter to applet, Lines, Rectangles, Circles, Ellipses, Arcs, Polygons, Line graphs, Bar charts, Control loops in applet

Unit-4: Java Database Connectivity:

The design of JDBC, JDBC driver types, Basic JDBC programming, concept.

Unit –5 Java Beans and Swing:

Introduction to Java Bean, Advantages of Java beans, Application Builder tools, Using BDK, JAR Files, JApplet, JIcons and Labels, Textfields, Buttons, Combo Boxes, Scrollpanes, Trees, Tables, Menu, Bars and Menus, Tool Bars, Dialog Boxes, File dialog, Progress Bar.

Unit 6

Servlets and Java Server Pages : The life cycle of a servlets, Using Tomcat for server development, A simple servlet, Using cookies, Session Tracking, Introduction to java server pages, A simple JSP, example, Scripting.

Text Books

1. Programming with Java A Primer – E.Balaguruswamy, McGrawhill
2. Java 7 Programming Black Book - Kogent Learning Solutions Inc, Dream Tech press

Reference Books

1. Java Fundamentals A comprehensive introduction- Herbert Schildt, Dale Skrien, McGraw Hill.
2. The Complete Reference, Java 2 – Herbert Schild, Fourth Edition, - TMH.
3. Core Java Volume-I Fundamentals- Horstmann and Cornell, - Pearson Education.

CM-302: Software Engineering

Course Objectives

This course introduces the concepts and methods required for the construction of large software intensive systems. It aims to develop a broad understanding of the discipline of software engineering. It seeks to complement this with a detailed knowledge of techniques for the analysis and design of complex software intensive systems. It aims to set these techniques in an appropriate engineering and management context. It provides a brief account of associated professional and legal issues.

Course Outcomes

After completing the course students will be able to understand the issues affecting the organization, planning and control of software based systems development, complete the analysis and design of a small software intensive system, read and understand the professional and technical literature on software engineering.

Course Contents

Unit 1: Product and Process

Evolving role of Software(SDLC), Software Characteristics, Software Applications, Crisis on the Horizon, Software Myths, A layered Technology, software process model, Evolutionary software process models, Component based development, fourth generation techniques, process and product.

Unit 2: Managing Software Project:

Introduction, Project Management Concepts, Software Process and Project Metrics.

Unit 3: Conventional Methods for Software Engineering

Introduction, System Engineering, Analysis Concepts and Principles, Analysis Modeling.

Unit 4: Design Concepts and Principles

Architectural Design, User Interface Design, Component-level Design.

Unit 5: Software Testing Techniques

Software testing Strategies, Testing tactics.

Unit 6: Object- Oriented Software Engineering

Introduction, Object-Oriented Concepts and principles, Objected-Oriented Analysis, Object-Oriented Design, Object-Oriented Testing, Technical Metrics for Object-Oriented Systems.

Text Books:

1. Software Engineering a Practitioners Approach- Pressman, 5th Edition, TMH.
2. An integrated approach to software Engineering- Pankaj Jalota, Narosa Publication.

Reference Books:

1. Software Engineering- Jawadekar, TMH Pub.
2. Software Engineering - Sommerville, Pearson Education.

CM-303 : Information Security and Audit

Course Objectives

The student should be made to Learn the security issues network layer and transport layer, Be exposed to security issues of the application layer, Learn computer forensics Be familiar with forensics tools, Learn to analyze and validate forensics data, audit trials

Course Outcomes

Upon completion of the course, the student should be able to discuss the security issues network layer and transport layer. Apply security principles in the application layer. Explain computer forensics. Use forensics tools. Analyze and validate forensics data.

Course Contents

Unit 1

IPSec Protocol - IP Authentication Header - IP ESP - Key Management Protocol for IPSec Transport layer, Security: SSL protocol, Cryptographic Computations – TLS Protocol.

Unit 2

PGP - S/MIME - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

Unit 3

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft and Identity Fraud. Types of CF techniques - Incident and incident response methodology – Forensic duplication and investigation.

Unit 4

Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

Unit 5

Processing Crime and Incident Scenes–Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

Unit 6

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

Text Books

1. Internet Security: Cryptographic Principles, Algorithms and Protocols- Man Young Rhee, Wiley Publications.
2. Computer Forensics and Investigations- Nelson, Phillips, Enfinger, Steuart, Cengage Learning, India Edition.

Reference Books

1. Computer Forensics- John R.Vacca, Cengage Learning.
2. Internet Cryptography- Richard E.Smith, 3 rd Edition Pearson Education.
3. Computer Forensics and Cyber Crime: An Introduction- MarjieT.Britz, 3 rd Edition, Prentice Hall

CM-304 A : System Administration and Server Integration

Course Objectives

This course introduces the UNIX/Linux family of operating systems. Basic commands, utilities, System structures, scripting and tools are explored. Elements of system administration are presented. This course is primarily oriented for would-be users of UNIX -- in the words of the course text, p. iv, for those "primarily interested in it as a tool". It is not a course in UNIX system programming (it is not a course in UNIX internals), nor is it a course in UNIX system administration, although I hope we will brush up against a few aspects of UNIX system administration during the course of the semester.

Course Outcome

Students who complete the course will have demonstrated the ability to do the use of basic UNIX/Linux commands from the command line (from a terminal window); organize and manage their files within the UNIX/Linux file system; organize and manage their processes within UNIX/Linux; usefully combine UNIX/Linux tools using features such as filters, pipes, redirection, and regular expressions; customize their UNIX/Linux working environment; be knowledgeable enough about basic UNIX/Linux shell scripting to be able to successfully read and write bash shell scripts; know how to use UNIX/Linux resources to find additional information about UNIX/Linux commands.

Course Contents

Unit- 1:

Definition of Operating System, Types of Operating System, features of Linux, Basic Architecture of Unix/Linux system, features of Kernel and Shell.

Unit-2:

Linux/Unix File system - Boot block, super block, Inode table, data blocks, How Unix/Linux kernel access files, Unix/Linux standard file system.

Unit 3:

Structure of file system, Essential Linux commands - Commands for files and directories creating and viewing files using cat, cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, file comparisons – cmpandcomm, View files, disk related commands, checking disk free spaces, chmod with its options, cal,date,who,tty, lp, stty.

Unit 4:

Filters and pipes: head, tail ,wc, pr, cut, paste, sort, unique, grep, egrep, fgrep ,tee,
The process: shell process, parent and children, process status, system process, multiple jobs in background and foreground, changing process priority with nice, premature termination of process, Mathematical commands- bc, expr, factor, units.

Unit 5:

Creating and editing files with VI editor with their command options, Operators, text deletion, text movement, changing text, yanking text, filtering text, the ex mode, moving text from one file to another. Communication: The bulletin board –news, write, mesg, talk, mail, elm, pine, finger, vacation and connecting to remote machine.

Unit 6:

System administration Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding and deleting users, changing permissions and ownerships, Installation of Unix/Linux system– Unix/Linux Installation requirement, complete Procedure steps, Partitioning the Hard drive, System startup and shut-down process, init and run levels. File system mounting, lpstat, backup strategy, installing software on Unix/Linux.

Text Books

1. Unix – Syed Mansoor Sarwar, Robert kortskey - Pearson Education.

Reference Books:

1. Unix concepts and Application- Sumitabha Das, Tata McHill
2. Using Linux – David Bandel and Napier, Pearson Education.

CM-304 B : Server and Desktop Technologies

Course Objectives: Configure and Troubleshoot Domain Name System, Maintain Active Directory Domain Services, Manage User and Service Accounts, Implement Group Policy Infrastructure

Course Outcomes: Best Practices for domain configuration Best Practices for group policy.

Units

1. Install servers, Configure servers, Configure local storage (Emphasis on windows server 2012)
2. Configure file and share access, Configure print and document services, Configure servers for remote management
3. Create and configure virtual machine settings Create and configure virtual machine storage, Create and configure virtual networks
4. Configure IPv4 and IPv6 addressing, Configure servers, Deploy and configure the DNS service
5. Install domain controllers, Create and manage Active Directory users, Create and manage Active Directory groups
6. Create Group Policy Objects, Configure security policies, Configure application restriction policies, Configure Windows Firewall

References

1. MCTS Self-Paced Training Kit (Exam 70-410): Installing and Configuring Windows Server 2012

Course Code:	CM-305	Based on CM-301	Credits: 02
Course Objectives: As per the Lab Manual circulated to students by the concerned Teacher			
Course Outcome: As per the Lab Manual circulated to students by the concerned Teacher			
Experiments As per the Lab Manual circulated to students by the concerned Teacher			

Course Code:	CM-306	Based on Elective Subject	Credits: 02
Course Objectives: As per the Lab Manual circulated to students by the concerned Teacher			
Course Outcome: As per the Lab Manual circulated to students by the concerned Teacher			
Experiments As per the Lab Manual circulated to students by the concerned Teacher			

Course Code:	CM- 307A	Open Elective	Credits: 02
Open Elective : University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR RUSA sponsored Future Oriented Courses			

OR

CM- 307 B : Technical Writings

Objectives : To acquaint students with a variety of forms of writing in science and technology; develop research skills; discuss and apply writing and formatting techniques; review grammar and revision.

Topics

1. Discussion of types of technical writing, audience analysis, and persuasion.
2. Discussion of definition writing and analysis of material.
3. Discussion of description of mechanisms and processes.
4. Discussion of library resources, research techniques, and proposal writing.
5. Discussion of collecting notes, writing outlines, and writing rough drafts.
6. Discussion of the elements of the formal research report.
7. Discussion of graphic aids in technical reports.
8. Discussion of grammar, technical writing style, and paper revision.
9. Discussion of the job application procedure, including application letters and resumes.
10. Discussion of plagiarism and professional ethics.

Course Code:CM-308

Course Title: **Seminar Presentation Activity**
(**SK-03 Skill Based Activity**)

Objectives :

1. To enable a student to be familiar with Communication skills
2. Student is expected to Learn – how to deliver a seminar
3. Every student must deliver a seminar on recent topic and one seminar report has to be submitted

CM-401: Software Testing

Course Objectives

To understand the testing concepts with software quality measures and quality assurance. To understand the defect management and improve software quality. To understand the testing tools.

Course Outcomes

This course will give deep knowledge about software testing concepts with various kinds of software tools and techniques. This course also guides students to learn software quality measures and quality improvement strategies.

Course Contents

Unit 1 Introduction

Introduction, Nature of errors, an example for Testing, Definition of Quality, QA, QC, QM and SQA, Software Development Life Cycle , Software Quality Factors Verification and Validation Definition of V andV, Different types of V and V Mechanisms, Concepts of Software Reviews, Inspection and Walkthrough.

Unit 2 Software Testing Methods and strategies

Testing Fundamentals, Test Case Design, White Box Testing and its types, Black Box Testing and its types, Strategic Approach to Software Testing, Unit Testing, Integration Testing, Validation Testing, system Testing.

Unit 3 Software Metrics and Defect Management

Concept and Developing Metrics, Different types of Metrics, complexity metrics, Definition of Defects, Defect Management Process, Defect Reporting, Metrics Related to Defects, Using Defects for Process Improvement.

Unit 4 Quality Improvement

Introduction, Pareto Diagrams, Cause-effect Diagrams, Scatter Diagrams, Run charts.

Unit 5 Software Quality Assurance and Quality Costs

Concepts, Quality Movement, Background issues and SQA activities Software Reviews, Formal Technical Reviews, Formal approaches to SQA Statistical Quality Assurance, Software Reliability, SQA Plan, The ISO 9001 Quality Standard, Six sigma, Informal Reviews, Quality Cost Measurement, Utilizing Quality Costs for Decision-Making .

Unit 6 Testing Tools

Testing Tools, Introduction to Junit, Apache Jmeter, Winrunner, Loadrunner, Rational Robot

Text Books

1. Software Engineering A Practitioners Approach-, Roger S. Pressman, Tata McGraw Hill
2. Software Engineering for Students- A Programming Approach - Douglas Bell, Pearson.
3. Software engineering: An Engineering approach- J.F.Peters, W.Pedrycz, Wiley Press.

Reference Books:

1. Quality Management- Donna C. S. Summers, 5th ed., Prentice-Hall.
2. Total Quality Management- Dale H. Besterfield, Prentice Hall.
3. Software testing- Yogesh Singh, Cambridge publication
4. Software Testing and Quality Assurance Theory and Practice- Kshirsagar Naik, Priyadarshi Tripathy, Nirali Prakashan.

CM-402: ASP.NET using VB.NET

Course Objectives

This course will cover the practical aspects of multi-tier application development using the .NET framework. This course is to introduce the basics of distributed application development.

Technologies covered include the Common Language Runtime (CLR), .NET framework classes, VB, ASP.NET, and ADO.NET. It also cover service oriented architecture, design, performance, security, content managements and deployment issues building multi-tier applications.

Course Outcomes

Upon completion of this course, the student will be able apply technical knowledge and perform specific technical skills, including design web applications using ASP.NET.

Course Contents

Unit 1 Web Components

Introduction to Internet, Web Client/Server Model, Protocols for Web Client/Server Communication, Understanding Web Server IIS.

Unit 2 Introduction to ASP.NET

DOT NET Framework, CLR, Framework Class Library, Garbage Collection, MSIL, Web Services, COM+ Component Services, Intro to ASP.NET, ASP.NET and HTML Controls, ASP.NET Events and Events Handler.

Unit 3 Web Programming with VB.

Data Types, Variables, Expressions, Flow Control, Operators, Conditional Statements, Looping Structures, Arrays, OOP Concepts, Objects, Properties, Methods, Classes, Scope, Events

Unit 4 Essentials ASP.NET

Working with Web forms, Directory Structure in ASP.NET, ASP.NET Compilation Model, Code behind Model, Working with Web form Controls, Navigation Controls, Validation Controls, Validation Groups, Client/Server Side Validation.

Unit 5 ASP.NET Master Page

ASP.NET Master Page Overview, Master Page Layout with CSS, Master Page Directive and Content Place Holder, Creating and Applying Themes, Cookies, ASP.NET Session State, Application State

Unit 6 Data Access with ADO.NET

Working with ADO.NET, Overview of ADO.NET Objects, Working with Connection Object, Command Object, Data Adapter Object, Data Set Object, Data Reader Object, Data Table Object.

Text Books

1. ASP.NET and VB.NET Web Programming - Coruch Matt J, Addison Wesley.
2. ASP.net – The Complete Reference- Matthew MacDonald, Tata McGraw Hill
3. Beginning ASP.NET 2.0- John Wiley and Sons, Wrox Publication.

Reference Books:

1. ASP.NET3.5 in C# and VB- Bill Evjen, S. Hanselman, Devin Rader, Wrox Publication
2. Pro ADO.NET 2.0- Sahil Malik, A-Press.
3. Ado.Net: The Complete Reference- Michael Otey, Tata McGraw-Hill Education

Course Code: CM-403
Course Title: Major Project development Activity

Course Objectives:

To provide a postgraduate level knowledge in computer science, including understanding, analysis, management, and handling of real-life information technology problems in workplace. Students are encouraged to problems from real life / NGO/ / state-central govt projects/ hackathon/ etc

Course Outcome:

Project based learning will increase their capacity and learning through shared cognition. Students will have an ability to identify, formulate and implement computing solutions. Students will be able to design a system, component or process as per needs and specification.

Guidelines for Project Development:

1. A group of maximum three students should be formed at the beginning of the semester
2. Each project will be allotted one project guide.
3. Students must submit the project topic and synopsis to the project guide.
4. Students will be given a project approval letter signed by the head of department and the project guide.
5. After receiving a project approval letter, students must submit at least three progress reports of their development in project to the guide, one per month.
6. After completion of project students have to give pre-exam demo to his guide.
7. After finalization of the project, students must prepare minimum 03 copies of the project reports, out of which one copy is for the college and one copy is for the university records. University/College copy must be bind with black covering with golden embossment and it should contain
 - i. First Page
 - ii. Certificate
 - iii. Declaration
 - iv. Acknowledgement
 - v. Project Approval letter
 - vi. Three Progress reports
 - vii. System Flow Diagram/DFD
 - viii. Chapter wise briefing, results, conclusions, snapshots, code, etc
 - ix. Bibliography

CM-404 A : Software Project Management

Course Objectives

Software Project Management covers details about handling the project activities, principals and modern software project management practices. The five process groups and nine knowledge areas of the Project Management Institute Body of Knowledge (PMI BOK) are examined in the context of the systems development lifecycle. Portfolio management and the use and application of software project management tools are also discussed

Course Outcome

Students will Understand the five process groups and nine knowledge areas of the PMI Book, Understand approaches for managing and optimizing the software development process, Understand efficient techniques for managing each phase of the systems development lifecycle, Use and application of tools to facilitate the software project management process.

Course Contents

Unit-1 Fundamentals of Project Management

Definition, Characteristics of Project, Types of Project, Project Phases, Project management Process, Project life cycle, Project Life Cycle Models

Unit-2 Project formulation

Significance of project formulation, Step-Wise Approach to Project formulation, Feasibility analysis, Cost Benefit Analysis, Cash flow forecasting, Return on Investment.

Unit-3 Software project Approach Selection

Project Vs Activity, Activity Planning, Planning Approaches, Process models, Waterfall model, V Model, Spiral model, Software prototyping, appropriate model selection

Unit-4 Software Effort Estimation

Software estimation techniques, Estimation Approaches, Definition of Project scheduling, Project controls and importance, Network techniques of Project Management: Gantt chart, CPM, PERT, COCOMO

Unit-5 Risk and Uncertainty Decisions

Project Risk, Types of Project Risk, Identification of Risk, Risk Prioritization, Project risk Analysis, Qualitative analysis and Quantitative analysis, Sensitivity Analysis, Break Even analysis, Risk Planning

Unit-6 Resource Allocation

Resources, Burman's Priority list, Cost Schedules, Software quality assurance, relation between software quality and software productivity, Role of project manager in software development

Text Books

1. Project Management, S. Chaudhary, Tata McGraw Hill.
2. Project-Preparation, Appraisal, Budgeting and Implementation, Prassna Chandra, Tata McGraw Hill.

Reference Books:

1. Software Project Management, Bob Hughes and Mike Cotterell, Tata McGraw Hill.
2. Software Project Management: A real-world Guide to Success, Joel Henry, Pearson education.

CM-404 B: Mobile Application Development

Course Objectives

Today's applications are increasingly mobile. This course teaches students how to build mobile apps for Android that is today's mobile operating platforms. Students learn to write both web apps and native apps for Android using Eclipse and the Android SDK platforms.

Course Outcomes

At the conclusion of the course, students should be able to understand the basic concepts of mobile computing, Learn the basics of mobile telecommunication system, Be exposed to Ad-Hoc networks and Gain knowledge about different mobile platforms and application development

Course Contents

Unit 1 Introduction

Introduction to Mobile Computing, Introduction to Android Development Environment, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development, Android User Understanding B4A for Android: Installing Basic4Android and Android SDK, Install and configure Basic4Android, Installing Android Emulator, My first program (MyFirstProgram.b4a), Second program (SecondProgram.b4a)

Unit 2 Understanding Android Mobiles and the IDE of B4A

Screen sizes and resolutions (Special functions like 50%x, 50dip, PerXToCurrent, PerYToCurrent - 50%x, DipToCurrent - 50dip), Understanding various Android Emulators for B4A, Understanding B4A bridge (The Designer, Tools, General Setting)

Menu and Toolbar, Toolbar, File menu, Edit menu, Project menu, Tools menu, Code area, tabs

Unit 3 Process and Activity life cycle

Variables and objects, Variable Types, Names of variables, declaring variables, Simple variables, Array variables, Array of views (objects), Type variables, Casting, Scope(Process variables, Activity variables, Local variables), Tips and Modules(Activity modules, Code modules, Service modules)

Unit 4 Understanding Basic Language

Program flow, Process Globals routine, Globals routine, Activity Create (First Time As Boolean) routine, Activity Resume routine, Activity Pause (User Closed As Boolean) routine, Expressions (Mathematical expressions, Relational expressions, Boolean expressions), Conditional statements (If – Then – End If, Select – Case) Loop structures (For – Next, Do – Loop), Subs (Declaring, Calling a Sub, Naming, Parameters, Returned value), Events, Libraries (Standard libraries, Additional libraries folder)

Unit 5 Creating User Interface,

Menu example, TabHost example, Button toolbox example, Scroll View examples, SQLite Database (SQLite Database basics, SQLite Database example program), GPS (GPS Library, GPS Objects)

Unit 6:

String manipulations, Files (File object, Text Writer, Text Reader, Text encoding), Graphics and Drawing

Text Books

1. Fundamentals of Mobile Computing- Prasant Kumar Pattnaik, Rajib Mall, PHI Learning Pvt.Ltd, New Delhi.

Reference Books

1. Java: A Beginner's Guide- Herbert Schildt, Oracle Press.
2. Learning Java by Building Android Games- John Horton, Packt Publishing.
3. Android Programming for Beginners- John Horton, Packt Publishing.

Course Code:	CM-405	Lab 7: Based on CM-402	Credits: 02
Course Objectives: As per the Lab Manual circulated to students by the concerned Teacher			
Course Outcome: As per the Lab Manual circulated to students by the concerned Teacher			
Experiments As per the Lab Manual circulated to students by the concerned Teacher			

Course Code:	CM-406	Lab 8: Based on Elective Subject	Credits: 02
Course Objectives: As per the Lab Manual circulated to students by the concerned Teacher			
Course Outcome: As per the Lab Manual circulated to students by the concerned Teacher			
Experiments As per the Lab Manual circulated to students by the concerned Teacher			

Course Code:	CM- 407A	Open Elective	Credits: 02
Open Elective : University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR RUSA sponsored Future Oriented Courses			

OR

CM- 407 B : Information Communication Technology (ICT)

Course Objectives:

The Information and Communication Technology is Open elective course. This syllabus is developed according to the concepts of skills required in all most all domains. This course offers deep understanding of ICT usage and its applications, which enable students to meet their individual needs.

Course Outcomes:

This course will developed technical, practical, personal and organizational skills in students. This course benefits students to meet their personal as well as global needs according to ever growing challenges in ICT.

Course Contents

Unit 1 Computer Fundamentals

Information processing Cycle, Brief History of Computers, Environmental, social and ethical issues, laws of ICT, Organizations of Computer System, Introduction to Operating Systems, measures to protect data and systems

Unit 2 Application Software

Advance Word Processing, working with styles, templates, forms, Advance Spreadsheets, working with multiple worksheets and workbooks, advance functions, Making presentations, working with multimedia presentations

Unit 3 Database

Working with data, tables, and relationships, creating and customising queries, customising forms, creating reports

Unit 4 Information and Communication systems

Information systems, networking concepts, functions of network devices, cabling standards, firewall, networking protocols, network security

Unit 5 Internet Terminology

Web Fundamentals, Web Security, Communication protocols, creating web pages, working with images and multimedia, working with special effects

Unit 6 Applications of ICT

Career options in ICT, Job search on Internet and other media, Formatting Resume or CVs, Formatting Application Letters, working with publications

Text Books

1. Computer Fundamentals, Ms Office and Internet and Web Technology- Dinesh Maidasani, Firewall Media.
2. Computer Fundamentals- Anita Goel, Person Education.
3. Computer Fundamentals- P. K. Sinha, EduTech Learners.

Reference Books:

1. MS Office for Dummies- Wallace Wang, Wiley Publishing, Inc.
2. Ms Office Step by Step- John Lambert, Microsoft Press.
3. Access Bible - Michael Alexander, Wiley Press.
4. Fundamentals of Computer Networking - Sanjay Sharma, Katson Press.

Course Code:CM-408
Course Title:**Skill Based Activity**
(SK-04 Soft Skills)

- Soft skill Necessary for IT recruitment and further studies
- Strong technical skills are essential for any IT (information technology) position. However, IT employees also need soft skills, sometimes known as interpersonal skills. IT professionals need to be able to interact successfully with others, as well as manage projects and teams.
- Employers have found that many IT professionals possess as many interpersonal skills as anyone else. Technology experts suffering from more severe social handicaps (such as functional forms of autism) are able to practice and learn interpersonal and other soft skills to help them integrate well within a team.